THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
October 15, 1990 · Vol. XXIV · No. 42 · 144 Pages · $2/Copy · $48/Year

COMPUTERWORLD

INSIDE

In Depth — Sci-fi writer William Gibson explores cyberspace. Page 107.

Executive Report — Systems help marketing staffs sniff out fresh opportunities. Page 93.

Gary Biddle, outsourcing pioneer at American Standard, died recently while on a business trip. Page 4.

Nynex dogged by former employee and his computerized files, which documented questionable business practices. Page 6.

IBM, Federal Express awarded prestigious Baldrige quality management prizes. Page 10.

'Cooperate' is the theme of NCR office software suite based on client/server concepts. Page 138.

Trade show interest slides for *Computerworld* readers who were surveyed on current and future attendance plans. Page 4.

EDS push through IS doors builds up multibillion-dollar 'juggernaut.' Page 113.

Software AG unwraps multiplatform distributed applications strategy. Page 140.

Intel 'double-crossed' AMD, arbitrator rules; fate of 80386 transfer rights remains undecided. Page 141.

Compaq to lead 'lite' brigade

BY RICHARD PASTORE
CW STAFF

NEW YORK — When Compaq Computer Corp. unveils its next-generation LTE notebook-size computer today, it will open the floodgates for a deluge of me-too competitors and price wars, observers said. The LTE 386S/20 will set a de facto standard and may prove a tough act for even Compaq to follow, some analysts noted.

An Intel Corp. 80386SX-based, IBM Video Graphics Array-compatible machine has long been anticipated as the next evolutionary step for notebook-class personal computers. Optimized to run more sophisticated software, such as Microsoft Corp.'s Windows 3.0, the Compaq system matches the minimum desktop specifications being set at most medium-size and large businesses.

The LTE 386S, scheduled to ship this month, promises to improve on the weaknesses of its predecessors. Instead of a stunted screen, Compaq has incorporated a full-size, 9-in. diagonal display that is "edgelit" rather than backlit. Full-fingered users may be happy to find that the unit's keys are not cramped, but rather standard-spaced. Compaq has also added 4K bytes of disk cache and the options of an internal modem and compact disc/read-only memory adapter, among others.

Perhaps more importantly, all LTE model cases will now be made of a more durable plastic, a Compaq spokesman said. Cracks in LTE and LTE 286 cases have resulted in a 30% to 40% rejection rate in some areas, according to Peter O'Connor, president of Laptop Expositions in New York. Owners of older LTE models will receive a lifetime case warranty for free replacement.

Continued on page 141

Upscale laptop

Compaq's latest laptop PC will feature more memory, advanced graphics and a more powerful CPU than the LTE 286

	LTE 386S/20	LTE 286
Processor	20-MHz Intel 80386SX	12-MHz 80286
Memory	2M to 10M bytes	640K to 2.6M bytes
Hard disk	30M or 60M bytes	20M or 40M bytes
Display	VGA, 16 gray shades	CGA, 4 gray shades
Weight	7.5 pounds	6.7 pounds
Base price	$6,499	$3,499

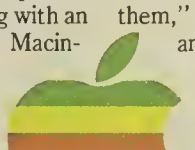
Source: Compaq Computer Corp. CW Chart: Marie Haines

Apple paring Mac costs

Move seen as key to regaining lost market share

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — Beginning today, millions of people can potentially do something with an Apple Computer, Inc. Macintosh that they were unable or unwilling to do before — own one.



Apple begins its long-awaited move to become a supplier of inexpensive personal computers today with the unveiling of three Macintosh PCs designed to regain the low-end market share that has been slowly eaten away by inexpensive IBM Personal Computer-compatible clones.

While the trio is expected to reinforce Apple's strong presence in the home and education markets, analysts said it may also accelerate Apple's expansion into the corporate world — the traditional domain of DOS-based clones.

"When it came to price, Apple always entered the world of big business with one strike against them," said Benny Lorenzo, an analyst at San Francisco-based research firm Volpe, Covington and Welty.

Apple customers said they are hungry for the new machines. "This is long overdue; we're anxious for them," said Rick Christjansen, manager of automation support at the Manville Technical Center in Denver. Christjansen said he is particularly eager to purchase the Macintosh SI because its internal Nubus expansion slot will facilitate network hookup.

Leading the rollouts at the firm's Fremont, Calif., manufacturing facility will be the

Continued on page 6

Software clan to patrol hype

BY NELL MARGOLIS
CW STAFF

BOSTON — Executives from more than a dozen software companies convened last week to declare open season on dubious marketing and accounting practices that they see as threatening their industry's credibility — and credit.

The fledgling Software Business Practices Council said it wants to stop sky-high marketing hype, vaporware announcements, misleading advertising and "creative accounting" by software vendors.

While the group includes such notable members as Ashton-Tate Corp., Digital Equipment Corp. and Lotus Development Corp., the software industry's biggest players have so far failed to join, and observers said they doubt the council can make much of an impact without them.

The council's two-pronged plan is to get the word out that "straight-shooting software vendor" is not an oxymoron and

Continued on page 8

Quake threat still haunts data sites

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — One year ago this week, the San Francisco region reeled in the wake of a major earthquake that measured 7.1 on the Richter scale. It took many information systems shops days to recover from the Oct. 17, 1989, quake, and for a few sites, the path back to normalcy took months. The passage of a year has softened the memory of those painful 30 seconds when 62 people lost their lives amid the rubble of buildings and highways, but it does not appear to have caused computer operations to pack up and leave.

With a commitment born of San Francisco's history of rising above natural catastrophe — including the April 1906 earthquake and fire — area firms are still reviewing backup procedures and signing up for hot-site recovery services.

But San Francisco IS managers admitted last week to a certain fatalism about future quakes. Shaklee Corp.'s data center moved across San Francisco Bay into an earthquake-resistant building in Hayward, Calif., a few months before the quake. "We haven't done much more since then to prepare for the next one," said Hugh Bradley, director of MIS at the San Francisco-based firm.

Some shops protect themselves by having dual data centers. "We're continuing to revise our plans," said John Parady, executive vice-president of technology services at the Pacific Stock Exchange, which has computerized trading floors in San Francisco and Los Angeles. "If we should ever lose the San Francisco data center, we could stay up and running in Los Angeles. But we've tightened up on a few things, like having redundant data in both centers." After the

Continued on page 139

NEWSPAPER

IN THIS ISSUE

NEWS

4 **Gary J. Biddle**, an American Standard IS executive who recently passed away, is fondly remembered as a man who "practiced what he preached."

6 Attorney Scott Rafferty expects to topple giant ex-employer **Nynex** soon with the help of computer technology.

8 An independent maintenance company crosses swords with **Prime** for allegedly imprisoning its customers in maintenance contracts.

10 1990 winner of the **Baldrige** award for quality management, IBM says it regards the honor as a promising sign, not a landmark.

14 The **X/Open Consortium** is opening its doors to more user input in its standards-making process.

14 **Banyan** reverts to original networking software focus as it prepares to ax its long-range, RISC-based network server plans.

140 Software AG is building an **Entire** bridge to close the gap between its old mainframe-oriented software and its forward-thinking, distributed software plans.

141 Diskless PS/2 workstations announced by **Big Blue** are not really big news.

Quotable

"If NCR makes this work, they'll be No. 2 in no time, and IBM better watch out."

DICK REDDECLIFF
SARASOTA COUNTY

On NCR's cooperative processing strategy. See story page 138.

SYSTEMS & SOFTWARE

29 Where, oh where is **IBM**'s distributed database environment?

29 Will customers who are jittery about **CDC**'s future hang tough or slither away? CDC is taking pains to ensure their loyalty.

PCs & WORKSTATIONS

41 PCs can finally avail themselves of high-quality mainframe-type printers, including all the perks.

45 Smart food: **Mrs. Fields Cookies**' motto is for technology to keep up with retail information.

NETWORKING

73 Decision-making is getting tangled in the lengthening list of cable options.

MANAGER'S JOURNAL

83 Self-described 'scientist gone mad' **Howard Ory** is not your typical IS chief.

COMPUTER INDUSTRY

113 Firms outsourcing to **Electronic Data Systems** call it pushy but reliable in delivering the cost savings it promises.

EXECUTIVE REPORT

93 Marketing departments make heavier use of information systems than of IS departments.

IN DEPTH

107 Welcome to the eerie world of **cyberspace**, courtesy of *Neuromancer* author William Gibson.

DEPARTMENTS

8, 140 News Shorts
22 Advanced Technology
24 Editorial
91 Calendar
120 Computer Careers
135 Training
130 Marketplace
137 Stocks
142 Trends

The Fifth Wave

"WE HARDLY GET ANY COMPLAINTS FROM USERS ANYMORE. THINK IT'S BECAUSE WE HIRED A TROGLODYTE TO RUN THE DEPARTMENT?"

EXECUTIVE BRIEFING

■ **The thrill is gone from trade shows.** A *Computerworld* survey of information systems managers reveals that they are cutting back on spending during a blah economy and that they have pared attendance at trade shows. Fifty-three percent of the managers surveyed say they are attending fewer shows than they were two years ago. While show organizers claim that attendance is up, IS folks say they are more interested in educational conferences. **Page 4.**

■ **Market research is nothing new,** and, as the Edsel showed the people at Ford three decades ago, market research is not perfect. What *is* relatively new, however, is the use of computer-based systems to uncover opportunities that are buried amid the massive amounts of facts and figures collected in conjunction with a new product launch. Some companies have success stories to relate. **Page 93.**

■ **Well-known and respected IS exec Gary J. Biddle** died recently of an apparent heart attack. Biddle, 52, had worked since his teens at American Standard, rising to the position of vice-president of IS technology. His peers call him a "lovely guy and real gentleman." **Page 4.**

■ **The aftershocks may be gone but the memories live on** one year after the Northern California earthquake of 1989. IS executives say they learned some lessons from the quake: not only how to tie down bouncing disk drives but also how to deal with the human element of a disaster. **Page 1.**

■ **There may be a multiplatform distributed database** in IBM users' future, but the wait just seems to grow. IBM executives indicated, that current plans call for a late 1991 announcement of a shipment date. **Page 29.**

■ **IS professionals aren't counting on banking careers** these days. With layoffs and cutbacks smacking the nation's largest banks, executives are forced to rethink their strategies. The fortunate ones are those with highly specialized skills; the less fortunate ones are those with "plain vanilla" mainframe backgrounds. **Page 120.**

■ **The old days of easy cabling decisions** are gone. Standards once dictated what you used: coaxial for Ethernet and shielded twisted-pair for token-ring. Today, managers are dealing with multiple choices involving numerous types of cables. The upside is that decision-makers have more flexibility. The downside is that decision-makers must make more decisions. **Page 73.**

■ **Police thyself** is what the software industry may be telling its members. Representatives of a dozen software vendors last week acknowledged that the industry has had its problems with things such as vaporware, marketing hype and creative accounting practices. The vendors plan to set up ethical guidelines for the industry to follow. **Page 1.**

■ **Politics is a fact of life** in organizations. An IS manager offers some tips based on his experiences on how you can learn to play the game. **Page 135.**

■ **On-site this week:** It may have been good as far as paper-based systems go, but it was still paper. A major plumbing supplies distributor, Ferguson Enterprises, is working on the replacement of its longtime manual system with a Pick-based computer system. **Page 33.** Expert systems that draw data down from IBM AS/400s to PCs are a key ingredient for Mrs. Fields Cookies. **Page 45.** "Why wait?" seems to be the theme at Stanford University, where management decided not to let vendors choose which protocols should be used for high-speed networking. The university is evaluating Switched Multimegabit Data Service as a means to provide 45M bit/sec. communications among researchers, academicians and scientists. **Page 78.**

DAY IN AND DAY OUT, SYNCSORT PERFORMS BRILLIANTLY FOR VM AUDIENCES.

VM audiences count on Syncsort for the best performing VM sorting, backup, and archive products. Products that save system resources — CPU time, I/Os, elapsed time, disk space — day in and day out.

Syncsort/BACKUP (SYBACK) performs the fastest logical and physical backups, giving you complete file, minidisk, volume and system-level protection. And for disaster recovery, no product can restore a system faster.

SyncSort CMS is simply the fastest, most efficient sort, merge and copy product in the VM world.

Syncsort/ARCHIVE stores, tracks and retrieves little-used files. User-oriented and exceptionally easy to use, Syncsort/ARCHIVE makes archiving routine, freeing up valuable disk space.

And that's not all. Over the next few months, VM audiences will be introduced to Syncsort's new high performance productivity tools. Unlike other software companies, our commitment to VM is strong — and growing stronger.

If you're looking for today's best performing VM products, look to the company that leaves audiences cheering: Syncsort.

syncsort INC.
50 Tice Boulevard, Woodcliff Lake, NJ 07675
800-535-3355

Gary Biddle was outsourcing pioneer

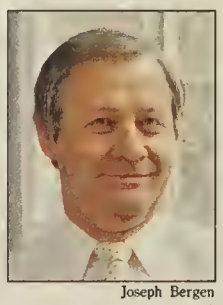
BY CLINTON WILDER
CW STAFF

American Standard, Inc.'s Gary J. Biddle, an information systems executive with a reputation for translating innovative thinking into action, died suddenly late last month at the age of 52.

Biddle, vice-president of IS technology at American Standard, died of an apparent heart attack in his sleep Sept. 26 during a business trip to the UK. Widely regarded as a pioneer of the current outsourcing trend, Biddle was in high demand as a conference speaker and spent a lot of time sharing his ideas.

"He was a lovely guy and a real gentleman, and I'm really very personally shocked and saddened by his loss," said Raymond Perry, corporate vice-president of IS at Avon Products, Inc. in Rye, N.Y. Avon chose to eschew the outsourcing route that American Standard embraced, but Perry credited Biddle with sparking the idea for data center consolidation that saves Avon $3 million per year.

"I had lunch with Gary last year to discuss that, and I now call it the $3 million lunch," Perry said. "I give him an awful lot of credit for getting our whole train of thought going. I'm sure American Standard is grateful to him for what he did there, but Avon owes him a debt of gratitude, too."



Joseph Bergen

Biddle practiced *what he preached*

Biddle was a lifelong American Standard employee, first employed there at age 18. He moved to data processing in 1973 and rose steadily through the ranks.

Biddle's career at the New York-based plumbing and transportation products firm was jeopardized by the hostile takeover bid of Black & Decker, Inc. in 1988. However, American Standard successfully fended off the bid with a leveraged management buyout, and Biddle stayed on as a major shareholder and executive.

The buyout debt forced him to look at technology costs differently, and he chose to outsource IS operations to Genix Corp. in 1988, well before outsourcing became a household name in IS. In a *Computerworld* profile early last year, Biddle predicted that outsourcing would become a major trend [CW, April 17, 1989].

Biddle "shocked IS managers into rethinking not only their mission but also their value-enhancing capacities to their enterprise," said Henry Pfendt, dirertor of information technology services at Eastman Kodak Co.

"Above all, he practiced what he preached," Pfendt added. "That will be his lasting legacy."

Pfendt's sentiments were echoed by Anthony DiRomualdo, an associate director at The Diebold Group, Inc. who worked closely with Biddle. The consulting firm adopted many of Biddle's ideas about measuring return on IS investment.

"A lot of people talk about those concepts, but successfully implementing them is another matter," DiRomualdo said. "American Standard was the only firm I knew that really did. Gary was a model in my mind of what an IS executive should be."

"The community of IS has lost a great spokesman," said John Imlay, chairman of Dun & Bradstreet Software and a vendor to American Standard. "I was just forming my customer council, and he was the first name on it. I'm in shock. All of us will miss him, particularly me."

Trade shows losing appeal for cost-conscious IS execs

BY JOANIE M. WEXLER
CW STAFF

Computer trade shows appear to be fizzling — not sizzling — for the information systems manager, according to *Computerworld* readers, who say that today's dismal economic climate is forcing them to maintain a judicious grip on their corporate wallets.

Over 150 IS professionals recently surveyed by *Computerworld* reported that their exhibition-floor activity is waning, despite sponsor claims that attendance numbers are on an upward spiral.

According to the survey respondents, 53% are attending fewer shows than they were two years ago, and all respondents interviewed in a telephone follow-up acknowledged that they have no formal budget for show attendance.

"These are not boom economic times," said Roxolana Poluchowicz, manager of computing facilities at Stone Container Corp. in Chicago. "There is a value to shows in that it is convenient to be exposed to new products and technology all in one spot. But is that something we can live without by getting the same information less expensively? Yes."

David Long, director of IS at Hotsy Corp., a cleaning-machine manufacturer in Denver, added, "You can't get into a lot of detail at a show, so you're going to have to do more research anyway."

Consistent with their recent trade show behavior, 52% of the respondents also reported that their plans for the coming year call for decreased trade show attendance — both for themselves and their staffs.

IS professionals, however, seem to be holding in higher esteem the educational conferences often offered in conjunction with trade shows. Thirty-four percent of the survey respondents said they will attend more conferences and fewer trade shows, compared with 1.5% who said they will attend more trade shows and fewer conferences.

One network computing event, Interop '90, held last week in San Jose, Calif., did report a larger number of IS managers in its attendance profile. Niche shows, such as PC Expo and Networld '90, however, survive "because they're geared to specialists," according to Ralph Ianuzzi, president of Bruno Blenheim, Inc., which sponsors both PC Expo and Networld.

Interop President Dan Lynch said that he still sees a majority of engineers in attendance. "But these specialists are starting to have their managers in tow. They're guiding them to the booths and saying, 'See, it works — now will you sign the purchase order?' " Lynch commented.

The top ranked event in terms of usefulness was tradeshow giant Comdex/Fall '90, with an anticipated 120,000 attendees at its upcoming event in November, compared with its 118,000 head count in 1989. Comdex was cited by 23% of survey respondents as relevant to their jobs; PC Expo (14%) and Decworld (10%) were runners-up, followed by Info, Networld and local trade shows (4% each).

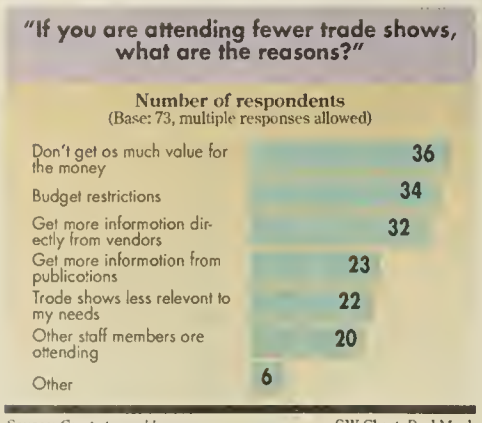
However, 18% of the respondents specifically replied "none" or "haven't attended any" to the usefulness question.

"I'm looking for applicability to my business environment," said Ron Landry, director of MIS at Freeport McMoran, Inc. in New Orleans. "Just to show a product that works has no meaning unless I can interpret how it can be applied to us."

One IS manager at a large law firm, who asked not to be identified, attributed the discrepancy between the survey and show sponsor numbers to increased attendance by end users. "As general-purpose users become increasingly aware of technology, they're going to demand more," he said, "and this will become a disjointed approach to corporate strategy."

Money, money

Cash problems and lack of show value are the top reasons users cited for skipping trade shows



Source: *Computerworld* CW Chart: Paul Mock

CORRECTION

Microsoft Corp.'s Windows 3.0 Supplemental Driver Library (SDL) may be downloaded at no charge from on-line services such as Microsoft Online, Compuserve and Genie. There is a $20 fee, however, if the SDL is obtained on disk from Microsoft.

A product listing in the PCs & Workstations section of *Computerworld* [Sept. 17] said that Inner Media, Inc.'s Wideangle Desktop Expansion program was "designed to expand OS/2 Presentation Manager applications further than the confines of a single personal computer screen." The product actually expands a user's OS/2 Presentation Manager desktop rather than OS/2 Presentation Manager applications themselves.

In the *Computerworld Premier 100* supplement, 3M Co.'s revenue was incorrectly reported. The company's sales were approximately $12 billion for 1989, and profits were $1.3 billion. In addition, Leon Selfe's position was incorrectly listed in the main chart; he is manager of data processing at Pittston Coal Group, Inc., a subsidiary of The Pittston Co.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin
News Editor
Peter Bartolik
Assistant News Editor
James Connolly
Senior Editors
Clinton Wilder, Management
Elisabeth Horwitt, Networking
Patricia Keefe, PCs & Workstations
Michael Alexander, Advanced Technology
Rosemary Hamilton, Systems & Software
Neil Margolis, Industry
Maryfran Johnson, Systems & Software
Senior Writers
Joanie M. Wexler
Richard Pastore
Staff Writer
Sally Cusack
New Products Writer
Gary Byrne
Research Coordinator
Kevin Burden
Features Editors
Glenn Rifkin
Joanne Kelleher
Senior Editors
Michael L. Sullivan-Trainor
Joseph Maglitta,
In Depth/Integration Strategies
Mary Grover, Product Spotlight
Managing Editor, Special Projects
Lory Zottola
Senior Writer
Alan J. Ryan
Associate Editors
Laura O'Connell
Cathleen A. Duffy
Researchers
Jodie Naze
Kim Nash
Intern
Derek Slater
Chief Copy Editor
Donald St. John
Assistant Chief Copy Editor
Joyce Chutchian
Features Copy Editors
Carol Hildebrand
Catherine Gagnon
Copy Editors
Christopher Lindquist
Kimberlee A. Smith
Alice Lesch Kelly
Kelly E. Dwyer
Design Director
Nancy Kowal
Graphics Designer
Tom Monahan
Graphics Specialist
Paul Mock
Design Assistant
Marie J. Haines
Assistant to the Editor in Chief
Linda Gorgone
Editorial Assistants
Lorraine Witzell
Tammy Gryniewicz
Stefanie McCann
Rights and Permissions Manager
Sharon Bryant
Book Issues
Margaret McIndoe
News Bureaus
Mid-Atlantic
201/967-1350
Johanna Ambrosio, Senior Correspondent
Washington, D.C.
Mitch Betts, National Correspondent
202/347-6718
Gary H. Anthes, Correspondent
202/347-0134
West Coast
415/347-0555
Jean Bozman, Senior West Coast Editor
J.A. Savage, Senior Correspondent
James Daly, Senior Correspondent
Jim Nash, Correspondent
Maura J. Harrington, Correspondent
Marilyn Scott, Editorial Assistant
Midwest
708/827-4433
Ellis Booker, Bureau Chief
Michael Fitzgerald, Correspondent
IDG News Service
Penny Winn, Director
Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
508/879-0700
Fax: 508/875-8931
MCI Mail: COMPUTERWORLD
Subscriptions: 800/669-1002

Unfortunately, The Best Is Yet To Come

Oracle database software lets businesses take advantage of each new generation of low cost computing.

Whatever types of computer a business buys today, there's sure to be something significantly better and cheaper tomorrow.

Yet companies continue to sink money into software that runs on only one kind of computer. Locking themselves out of newer, more cost-efficient computers.

This trap is avoidable for most companies. All they need is the right software. Software that works with virtually every computer and network. Present or future.

Oracle has become the world's largest database software company by providing just that. Software that runs on virtually every type of mainframe, minicomputer, workstation and PC.

And every time a newer, faster, more cost efficient computer has come along, Oracle has provided the database software not only to run on it, but allow it to share data with existing computers as well.

Call 1-800-633-1071 Ext. 8113 for more information.

Fortunately, you no longer have to predict the future to take advantage of it.

ORACLE®

Software that runs on all your computers.

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

PC aids Nynex whistle-blower

BY PATRICIA KEEFE
CW STAFF

WASHINGTON, D.C. — Much as David took on Goliath, attorney Scott Rafferty is knocking the stuffing out of telecommunications giant and former employer Nynex Corp. armed with little more than a PC and a handful of utilities.

Rafferty's efforts, coupled with testimony from other whistle-blowers, have cost Nynex millions of dollars, said Keith Gordon, assistant attorney general for New York State.

"Time after time, I've outtechnologied Nynex, the supposedly high-tech company," Rafferty said gleefully last week. "It's been very effective," agreed Gordon, adding that computer technology "made us far more capable of litigating our case effectively."

One reason technology has proven to be such an "equalizer" is Rafferty's estimate that most law firms are 10 years behind the computer wave.

Despite the fact that Nynex has spent $7 million fighting two suits involving Rafferty or his testimony, "they keep getting tripped up because of little things like Symphony 1.1," Rafferty said.

For example, two years ago, Nynex's high-powered legal team, army of paralegals and eight huge boxes of court documents were no match for his Toshiba Corp. 1000 laptop and Lotus Development Corp.'s Symphony. In August, at a hearing on the New York Telephone Co. rate case, Rafferty claimed he was able to keep Nynex witnesses on the straight and narrow by coupling Lotus' Magellan with a lone IBM Portable 386 whose 60M-byte hard disk was crammed with thousands of pages of deposition testimony.

Magellan 2.0 enabled the team to index various items and highlight key pages of testimony. The ability to intimidate witnesses by instantly calling up past testimony also saved a lot of time, Gordon said.

Perhaps Rafferty's most innovative application involved Peter Norton Computing, Inc.'s Norton Utilities, which was used to examine electronic mail records. Under court order, Nynex had included as part of 30,000 pages of hard-copy documentation a 500-page index to 50,000 electronic messages. Rafferty discovered that he had copies of only some of the messages.

Nynex uses Digital Equipment Corp.'s VAX-based E-mail system, which backs up new messages by overwriting old ones. Norton Utilities enabled Rafferty to retrieve pieces of older, underlying messages bit by bit. "He was able to obtain extremely damaging records that have played an enormous part in his private case against Nynex," Gordon said.

So critical was this evidence that Nynex charged Rafferty with theft and got a magistrate to enjoin him from even talking about the information he had unearthed. A U.S. Court of Appeals reversed that order, citing First Amendment rights.

Once upon a time, Rafferty was on Nynex's side. For seven months in 1986, he was vice-president of the Telecommunications Consulting Division at Nynex subsidiary Telco Research Corp. He was fired in November 1986 after asking Nynex officials whether plans for the consulting division overstepped a government waiver allowing it to sell and service software, Gordon confirmed.

The regional holding company, which owns New York Telephone and New England Telephone Co., among other ventures, has good reason to rue the day it fired Rafferty.

Working with the New York Attorney General's office, several federal agencies and a loose coalition of other Nynex whistle-blowers, Rafferty has figured prominently in a raft of administrative and civil proceedings filed against Nynex this year.

Symphonic suit

Whistle-blower Scott Rafferty's testimony has had a major impact on New York State's rate case against Nynex, according to Keith Gordon, an assistant attorney general for New York State.

One of the issues in the rate case concerned a group of suppliers involved in "highly irregular social activities" — that is, providing some Nynex executives with prostitutes and liquor.

Nynex's "so-called" investigation did an analysis of the amount of business these suppliers had with Nynex, beginning with the year before Nynex executives attended the parties, Gordon said.

This analysis produced about 40 pages of data, each page describing the volume of business for each of the suppliers during the period of a year. "Nowhere were there side-by-side comparisons of all the suppliers," Gordon said.

After receiving the document, Rafferty put Lotus' Symphony 1.1 to work. He put all the suppliers, their volume of business and the number of years involved into one spreadsheet. He then calculated a rated average of their growth and was able to demonstrate that those suppliers involved in the illicit parties experienced on average a 67% growth rate, compared with a 4% rate for suppliers who did not participate. "It literally proved to be a bombshell," Gordon claimed.

This evidence was not only put to use in state proceedings that are still ongoing, but it also helped to convince the New York State Public Utilities Commission to order a further investigation into the level of business done by these suppliers.

PATRICIA KEEFE

Apple

FROM PAGE 1

Macintosh Classic, a Motorola, Inc. 68000-based machine that resembles the Macintosh Plus and SE it replaces, which are being removed from Apple's price lists.

The 8-MHz Classic, which will run about 25% faster than the Plus, is structurally similar to the SE, but Apple hopes to snare new clients with the dramatic price differential. A Classic with one floppy drive will sell for $999 — compared with $1,799 for a similarly configured Plus — and $1,499 with a 40M-byte hard disk, compared with $3,498 for a similar SE setup.

The Macintosh LC will become Apple's lowest priced color system. It will use a Motorola, Inc. 16-MHz 68020 chip, making it about twice as fast as the SE, and is shaped like a small pizza box. A model with 2M bytes of random-access memory and a 40M-byte hard disk will sell for $2,499. The LC will be available in limited quantities through the end of the year with full availability expected in January, Apple officials said.

Rounding out the introductions will be the Macintosh IISI, a 20-MHz Motorola, Inc. 68030-based machine that is approximately five times faster than the SE. The SI will also offer standard sound input and become the lowest priced Macintosh to let users work under A/UX, Apple's implementation of the Unix operating system. A version with 2M bytes of RAM and a 40M-byte hard disk will sell for $3,769, while a model with 5M bytes of RAM and 80M-byte drive will cost $4,569.

Apple will supplement the unveilings with the rollout of three monitors: a 12-in. monochrome monitor for $299, a 12-in. red-green-blue color monitor priced at $599 and a 13-in. high-resolution color monitor for $999.

Apple officials said they were able to keep the price of the new models down by redesigning system components ranging from the logic board to the plastic used in the computer casing, thus trimming manufacturing costs.

At a recent briefing, Chief Executive Officer John Sculley also said the machines' low cost resulted from Apple's new belief that its traditionally high profit margins may fall victim to the company's quest to recapture market share. Since 1987, Apple has seen its portion of the $67 billion PC market shrink from nearly 15% to just 10%, according to Dataquest, Inc., a San Jose, Calif.-based research firm.

Some analysts, however, said Apple has been too laggard in getting the products to market. "Apple is way behind the curve [with the new PCs], and that's going to hurt," said Jim Poyner, an analyst at William K. Woodruff & Co., a research firm in Dallas.

Apple officials said the delay was a result of the system revamp, which, unlike earlier Macintosh releases, was not a simple reworking of previous specifications.

Mac attack

Apple is moving to shore up market share with systems priced more competitively with PC-compatibles

New

Apple machines

Macintosh Classic
- 1M byte RAM/floppy $999
- 2M byte RAM/40M-byte hard drive ... $1,499
- 8-MHz Motorola 68000
- Available Oct. 15

Macintash LC
- 2M byte RAM/40M-byte hard drive ... $2,499
- 12" RGB color monitor $599
- 16-MHz 68020
- Limited quantity available until end of year. Full availability in January

Macintosh IISI
- 2M byte RAM/40M-byte hard drive ... $3,769
- 5M byte RAM/80M-byte hard drive ... $4,569
- 13" RGB color monitor $999
- Keyboard $129
- 20-MHz 68030
- Sound input standard
- Available Oct. 15

Source: Apple Computer, Inc. CW Chart: Paul Mock

RISC-based Macs said to be on Apple's drawing board

BY JAMES DALY
and MAURA J. HARRINGTON
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. is reportedly working to integrate Motorola, Inc.'s reduced instruction set computing (RISC) microprocessor technology into its popular Macintosh personal computer line by as early as next year.

Apple insiders said they are exploring designs that would produce a Macintosh powered by a RISC chip, which is streamlined to operate significantly faster than standard chips and is commonly used in workstations. "There are a lot of intriguing possibilities there," said one Apple employee.

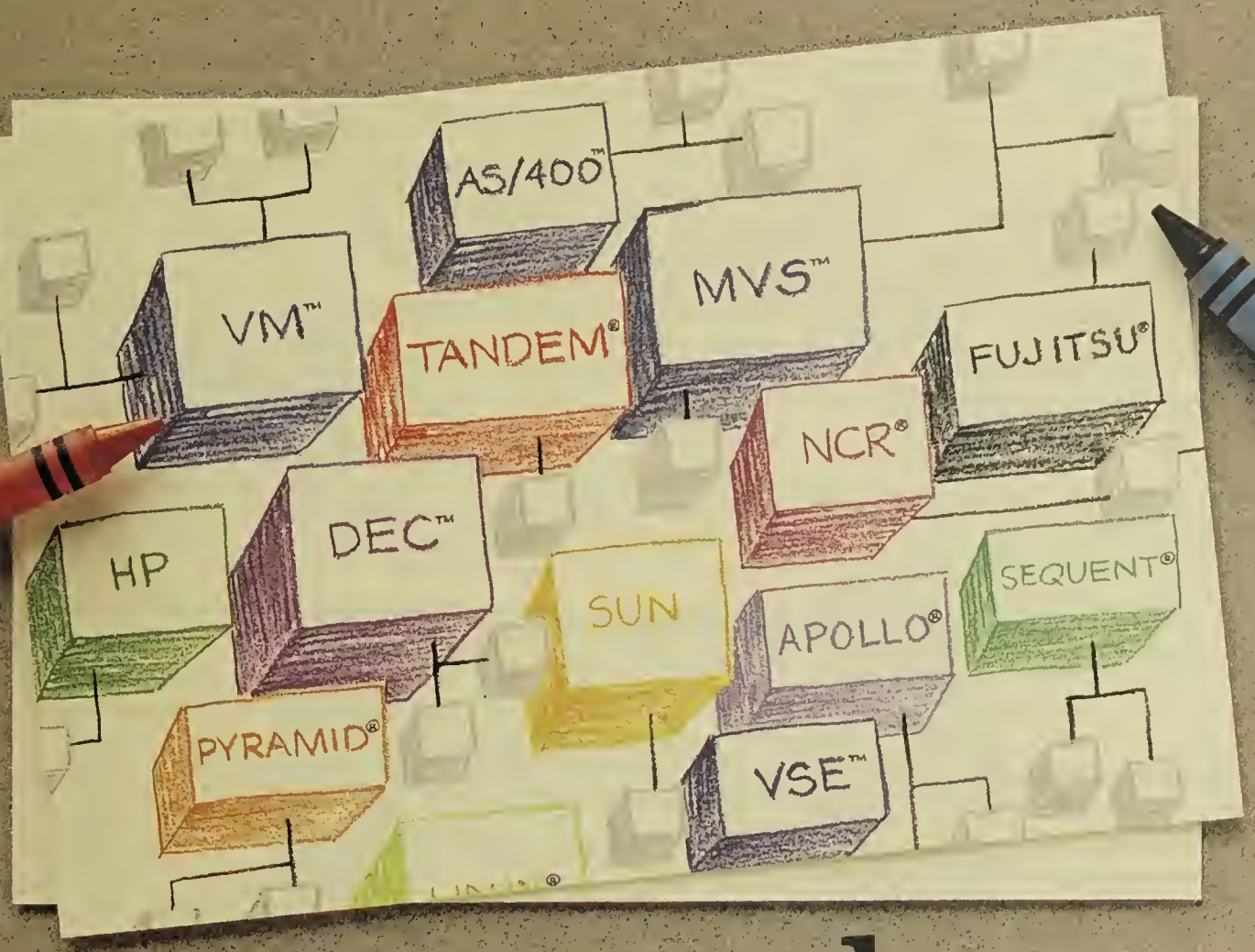
The move could be advantageous to both firms. Motorola, which is primarily known for its 68000 line of processors that forms the computational engines of the Macintosh series, has so far stalled in drumming up widespread interest in its current RISC offering, the 88000. Apple, meanwhile, is feeling the heat from workstation makers such as Sun Microsystems, Inc., Hewlett-Packard Co. and Digital Equipment Corp., which already use RISC technology and have targeted the price of their machines at the heart of the Macintosh line.

At last week's Microprocessor Forum technical conference in Burlingame, Calif., Motorola described plans to introduce a second-generation RISC chip, due out next year. Dubbed the 88110, the microprocessor is expected to contain over 1.4 million transistors and combine the CPU, cache memory and memory management sections on a single chip.

Motorola system architect Keith Diefendorff said the chip will be capable of running between three and five times faster than its current RISC chips, or between 50 million instructions per second (MIPS) and 85 MIPS.

The only hitch to the introduction of RISC technology into the Macintosh line is that it would require some software development finesse to get applications that work on the older machines to work on the new ones. Because a RISC machine would not be binary-compatible with the remainder of Apple's complex instruction set computing-based Macintosh line, a software emulator would need to be included with the new machine in order to run older applications.

To manage a multi-vendor network,



you need a multi-vendor vendor.

As multi-vendor information networks have become a fact of life, the ability to make everything work together has become a critical success factor — and a major differentiator among software vendors. At Systems Center, we've made the management of multi-vendor environments a top priority. And we offer integrated, multi-platform solutions that meet wide-ranging needs at both the mainframe and departmental levels. Whatever your own environment looks like, we're one multi-vendor resource you can count on. For information, write or call Systems Center, Inc., 1800 Alexander Bell Drive, Reston, Virginia 22091, 800-533-5128.

SYSTEMS CENTER

Systems and network management for the real world.

K-CWX-901015

©1990 Systems Center, Inc. VM, VSE, AS/400 and MVS are trademarks of International Business Machines Corporation. UNIX is a trademark of UNIX System Laboratories, Inc. DEC is a trademark of Digital Equipment Corporation. HP is a registered trademark of Hewlett-Packard Co. SUN is a registered trademark of Sun Microsystems, Inc. APOLLO is a registered trademark of Apollo Computer, Inc. or subsidiary of Hewlett-Packard Co. SEQUENT is a registered trademark of NCR Corporation. TANDEM is a registered trademark of Tandem Computers Incorporated. PYRAMID is a registered trademark of Pyramid Computer Systems, Inc. Pyramid is a registered trademark of Pyramid Technology Corporation. UNIX is a registered trademark of AT&T Bell Laboratories.

Federal quality prize awarded to IBM division

BY NELL MARGOLIS
CW STAFF

ARMONK, N.Y. — The world's premier computer company last week won the nation's premier quality award.

"Total quality management" exhibited by its Rochester, Minn., operations, home of the Application System/400, powered IBM into the winner's circle for the U.S. federal government's 1990 Malcolm Baldrige National Quality award — a gold medal that, since its establishment in 1987, has zoomed into public prominence as U.S. industry's rough equivalent to the Nobel Prize.

Sharing the honors with IBM this year were Federal Express Co., General Motors Corp. and Houston-based Wallace Co., a family-owned pipe and valve manufacturer that scored in the small business category.

While IBM is the only computer firm that will take home a trophy from next month's awards ceremony, Federal Express' appearance as the Baldrige award's first winner in the services category is also a victory for the information systems community. The Memphis-based delivery service's use of IS to garner some 40% of its worldwide market is approaching legend status [CW, July 2].

Established under federal statute in August 1987 and named for Secretary of Commerce Malcolm Baldrige, who was killed in a rodeo accident a month earlier, the Baldrige award seeks to promote quality awareness and achievement in U.S. companies, said John Makulowich, quality program public affairs official at the Washington, D.C.-based National Institute of Standards and Technology, which manages the award.

While approximately 90 companies completed applications in 1990 — more than twice the number of firms that competed in the award's maiden year — some 100,000 sent in for the application: a document containing qualification guidelines that add up to a virtual user's manual on how to inculcate quality.

IBM Rochester, in fact, used it that way in 1989. For the past two years, an IBM spokesman said, all aspects of work at Rochester have been guided and measured by the Baldrige qualifications, consciously chosen by the company as the ideal rules for its game plan.

The results, he said, include the AS/400's development cycle, which takes half the time of its predecessor's, and two years' worth of increasingly defect-free products and satisfied customers.

"As proud and happy as we are, we regard the Baldrige award as a promising signpost rather than an end in itself," said IBM Chairman John Akers in a prepared statement. "The work only begins here."

Akers saluted Rochester general manager Larry Osterwise and the approximately 8,000 Rochester employees for their award-winning effort.

GET THE BEST PC COBOL, EVEN IF IT SAVES YOU MONEY.

COMPETITIVE CHECKLIST

Description	REALIA COBOL	COBOL/2*	COBOL/2 WORKBENCH*
U.S. list price	**$995**	$900 + $95 for editor	$3,290
Automatic distribution of product upgrades	**YES**	FOR SOME CLIENTS	FOR SOME CLIENTS
Benchmark compile-and-link speed	**25 sec. (3 times faster)**	1 min. 14 sec.	1 min. 14 sec.
Benchmark execution speed	**4 min. 11.4 sec. (4.3 times faster)**	18 min. 17.2 sec.	18 min. 17.2 sec.
Benchmark executable file size	**104,713 bytes (2.6 times smaller)**	282,288 bytes	282,288 bytes
Benchmark source available for review	**YES**	NO	NO
DOS memory extender included	**YES**	NO	YES
No-charge run-time for DOS memory extender	**YES**	NO	NO
No-charge EBCDIC support under CICS and IMS	**YES**	NO	NO
OS/2 Presentation Manager support	**YES**	NO	YES
Dynamic Link Library support under DOS and OS/2	**YES**	NO	NO
Dialect support for IBM VS COBOL, VS COBOL II, ANSI-74, ANSI-85, etc.	**YES**	YES	YES

* Both are Micro Focus products. Company and product names are registered trademarks of their respective holders.

Micro Focus wants you to think you have to choose between the limits of COBOL/2 and the cost of Workbench. Not true.

Realia gives you the high-end product at low-end cost. You get all the speed and features you need in a COBOL compiler for the PC. And you don't have to read a foot of manuals to figure out how it works.

Developing and maintaining applications on the PC will save you time and money. Choosing Realia, for price and performance, will save you from buyer's remorse.

Call us for a free evaluation of the Realia programming environment.

REALIA®

U.S.: 312/346-0642 • U.K.: 071/602-8066 • CANADA: 613/725-9212

IBM announces disk array plan

BY ROSEMARY HAMILTON
CW STAFF

IBM edged toward the disk array arena last week by announcing a joint development deal with Maximum Strategies Corp.

The two companies plan to develop a disk array subsystem for engineering and scientific computing that uses a very high-speed interface standard called the High-Performance Parallel Interface, which clocks in at rates of up to 200M byte/sec.

However, IBM would not say when a real product may result from this effort.

"We don't know what will really happen," said Chris Wood, IBM manager of commercial analysis for the Storage Systems Product Division. "There may never be a product. It might flop."

Nonetheless, this first step shows that IBM has its eye on disk arrays and will likely go after this emerging business that so many other system and subsystem companies have targeted, analysts said.

Disk arrays and the redundant arrays of inexpensive disks (RAID) concept are the hot new topics in storage. Last month, EMC Corp. claimed to be the first to market when it introduced a subsystem that is an initial implementation of the RAID concept. Storage Technology Corp. has long been hinting that it will soon introduce an advanced RAID device, which is known in the industry by its code name, Iceberg. Meanwhile, most other systems vendors, including Amdahl Corp. and Hitachi Data Systems Corp., confirmed that they are researching this technology.

In simple terms, disk arrays or RAID devices could offer less costly fault-tolerant subsystems to replace traditional disk drives. The products would use strings of smaller disks and complex storage management techniques to provide performance of today's disk drives.

IBM has previously acknowledged research efforts and pointed out that it holds one of the first patents on disk array technology. The deal with Maximum Strategies, which is based in San Jose, Calif., is focused on a device that would be suited for numeric-intensive operations, Wood said.

Oracle Financials keep Burlington Coat comfortable year-round.

"We were dying under the weight of obsolete computing. We needed an integrated financial system with a user interface that wouldn't cause a mutiny. Not only did Oracle Financials deliver over one million invoice transactions this season, but it delivered a 100% happy user base."

Bob LaPenta, Controller and Chief Accounting Officer, Burlington Coat Factory

With over 150 stores around the country, Burlington Coat's biggest sales job was internal. Even though phenomenal growth had obsoleted their accounts payable, expenses and general ledger system, their employees knew how to use it. They knew the work-arounds and the pitfalls. They also knew the 1989 buying season would be their biggest ever. So they were willing to give the Oracle Financials™ family of products a close look.

The intuitive screens impressed them immediately, because Oracle Payables had a familiar feel. But they were literally rescued by the ability to modify vendor information on the fly. For example, their suppliers may have financed production with multiple lenders, or factors, who needed to be paid directly. Oracle Payables easily accommodated this, thereby eliminating the work-arounds, manual entries and overtime that had become a way of life.

A successful season and a million invoices later, Burlington Coat keeps their business warm with Oracle Financials.

Find out how the complete suite of Oracle Financials products—Oracle General Ledger, Oracle Purchasing, Oracle Payables, Oracle Assets, Oracle Receivables, Oracle Revenue Accounting, Oracle Inventory, Oracle Order Entry, Oracle Sales Analysis, Oracle Personnel, Oracle Alert—can keep your business out of the cold. They're so easy to learn and use, you can probably use our documentation to warm your own house.

ORACLE®

Call **1-800-ORACLE1, ext. 8195** today, to schedule a demonstration of Oracle Financials. The experience will be a profitable one for you.

Oracle Financials

U.S. SEMINARS

AL	Birmingham	Sep 5*fg*
AZ	Phoenix	Sep 11*cg* Oct 30*#2*
	Scottsdale	Sep 11*ug* Oct 25*gf*
CA	Anaheim	Sep 23*u* Sep 24*v*
	La Jolla	Sep 13*fg* Oct 23*g*
	Los Angeles	Sep 18*d* Sep 20*fg* Oct 16*c#1* Oct 17*gf*
	Newport Beach	Sep 18*fg*
	Riverside	Sep 25*cg*
	Sacramento	Oct 24*cg*
	San Diego	Sep 13*d*
	San Francisco	Sep 13*ig* Oct 18*gv*
	Santa Clara	Oct 11*gs*
	Woodland Hills	Sep 27*fg*
CO	Boulder	Oct 23*g**
	Denver	Sep 6*gif*
DC	Washington	Sep 20*gi* Oct 12*#2* Oct 23*gv* Oct 31*gm**
FL	Boca Raton	Sep 18*gi*
	Orlando	Sep 20*fg*
	Tampa	Oct 18*g#1*
GA	Atlanta	Sep 11*fg* Oct 16*gc*
	Savannah	Oct 2*g*
HI	Honolulu	Sep 20*fgs*
IA	Des Moines	Oct 17*f*
ID	Boise	Sep 18*cg*
IL	Chicago	Sep 20*cg* Oct 23*#1* Oct 25*gf*
IN	Ft. Wayne	Sep 27*cg*
	Indianapolis	Oct 30*g*
KS	Wichita	Oct 23*f*
KY	Lexington	Oct 9*g*
LA	Baton Rouge	Sep 20*cg*
	New Orleans	Sep 12*f* Oct 25*cg*
MA	Boston	Sep 6*cgi* Sep 7*gx* Oct 9*#2*
	Braintree	Oct 18*gs*
	Springfield	Sep 25*fg*
MD	Baltimore	Oct 1*g*
	Bethesda	Sep 20*f* Oct 25*f*
ME	Portland	Oct 30*g*
MN	Minneapolis	Sep 11*fg*
MO	Kansas City	Oct 11*cg*
	St. Louis	Sep 25*g*
NC	Charlotte	Oct 2*fc*
	Raleigh	Oct 5*g*
	Res Tri Park	Sep 13*f*
NE	Omaha	Sep 17*fg* Oct 25*gx**
NJ	Cherry Hill	Sep 11*cg*
	Iselin	Sep 9*fg* Sep 26*cg* Oct 24*g* Oct 25*f#1*
NY	Buffalo	Sep 18*gp*
	Long Island	Oct 17*v*
	New York	Sep 5*d* Sep 12*fg* Sep 26*cg* Oct 10*g* Oct 24*g*
	Rochester	Sep 11*fg* Oct 25*g*
	Syracuse	Sep 20*gp* Oct 30*f*
OH	Cincinnati	Sep 13*fg*
	Cleveland	Sep 6*g* Sep 7*d*
	Dayton	Oct 16*g**
OR	Portland	Sep 11*cg* Oct 23*fg*
	Berwyn	Sep 25*fg*
PA	Philadelphia	Sep 11*gs* Sep 25*fg* Oct 18*#1*
	Pittsburgh	Oct 1*hg#1*
SC	Columbia	Sep 13*fg*
TN	Memphis	Oct 23*gf*
TX	Austin	Sep 7*cg* Oct 10*fg*
	Dallas	Sep 11*gi* Sep 12*f* Oct 5*g* Oct 23*#2*
	Houston	Sep 6*cg* Sep 18*f* Oct 25*g* Oct 26*#2*
UT	Salt Lake City	Oct 4*fg*
VA	Norfolk	Oct 16*gc*
	Richmond	Oct 18*gf*
WA	Seattle	Sep 12*fg* Oct 2*#2* Oct 3*g#1*
WI	Greenbay	Oct 2*cg*
	Madison	Sep 26*cg*
	Milwaukee	Sep 6*fg*

Use the following key for identifying the special afternoon sessions that are offered with the seminar dates above.

c CASE/Application Tools	*u* Int'l Oracle User's Group
f Oracle Financials	*g* General
L Oracle Mail	*d* Client/Server Forum
i IBM	* Federal
s Secure Systems	*#1* CS *#1*
p PC/Mac Solutions	*#2* CS *#2*
x Unix	*v* VIP

Attn.: National Seminar Coordinator
Oracle Corporation · 20 Davis Drive
Belmont, California 94002

1-800-ORACLE1, ext. 8195

☐ My business card or letterhead is attached. Please enroll me in the *FREE* ORACLE seminar to be held

at: _____

on: _____

COMPWORLD

Copyright © 1990 by Oracle Corporation. ORACLE is a registered trademark and Oracle Financials is a trademark of Oracle Corporation. TRBA

Successful demo reassures users awaiting cheaper FDDI

BY JOANIE M. WEXLER
CW STAFF

SAN JOSE, Calif. — One year ago, the Interop show's Fiber Distributed Data Interface (FDDI) demonstration consisted of 12 vendors merely establishing connections among their equipment. Last week's edition showed 37 suppliers actually passing and managing data.

The progress is a reassuring sign for companies eyeing the high-speed fiber-based local-area network and hoping that the refrains of "we'll see the prices drop soon" come true.

Loral Aerospace, Inc. in Houston is currently running an FDDI backbone trial to interconnect LANs in six buildings. Bill Chalupnik, a senior research and development engineer, said seeing the Interop demo relieved his concerns, because his own FDDI interoperability testing — involving equipment from Cabletron Systems, Inc., Cisco Systems, Inc. and Proteon, Inc. — has not gone as smoothly.

"We've had a few problems, and it helps to see a successful demonstration," Chalupnik said. He added that his firm installed fiber cabling a year ago because it needed FDDI's 100M bit/sec. speeds, "but the cost and the development of the technology have slowed down our efforts."

The final component of the FDDI standard, Station Management, was approved by the American National Standards Institute (ANSI) in April, and many users and vendors were waiting for that before committing to products.

The average per-connection cost of FDDI today is generally considered to be about $11,000, although recent announcements from Digital Equipment Corp and Timeplex, Inc. have listed prices of about $8,000 per port for stations with a single attachment to a concentrator, which links to both of FDDI's dual, counter-rotating rings.

However, this is still a hefty investment for users accustomed to $200 Ethernet adapter card price tags. A report by Forrester Research, Inc. last spring predicted the per-connection price of FDDI will fall to $2,000 — but not until 1994.

Another Interop '90 attendee tapping his foot waiting for the hefty FDDI component costs to fall was Charles Benjamin, communications manager at the Northeast Regional Data Center of the University of Florida. Benjamin said he would like to move some of his Ethernets and token-rings, which serve as both backbones and LANs, to FDDI.

"The cost is holding us back," he said. "We'll go to an FDDI backbone first because bridging into individual buildings from a fiber backbone costs a lot less than a lot of direct attachments to individual FDDI LANs."

Pre-Interop rumors that several workstation vendors would be unveiling inexpensive direct-attach FDDI adapter cards were partially fulfilled — depending on a user's definition of "cheap." Silicon Graphics, Inc. introduced a dual-attachment card that interfaces the workstation directly to both rings without the need for a concentrator.

> "WE'VE HAD A few problems [with FDDI interoperability], and it helps to see a successful demonstration."
>
> BILL CHALUPNIK
> LORAL AEROSPACE

Silicon Graphics' $11,000 price tag is less expensive than the cost of Sun Microsystems, Inc.'s 1-year-old, $12,500 board or Hewlett-Packard Co.'s Apollo Division's $20,000 board, which is still in beta testing.

Dave Perro, a Silicon Graphics product manager, said that in two years, connection costs should drop significantly because of 600% reductions in the cost of a pair of fiber transceivers and plummeting FDDI chip set prices. He added that if the proposals for running 100M bit/sec. speeds over twisted-pair wiring — currently on the table for ANSI's FDDI committee meeting this week in Fort Lauderdale, Fla. — catch on, the cheaper twisted-pair alternative could provide the competition needed to spur FDDI vendors to lower their prices.

In the meantime, hub products introduced by Synernetics, Inc. ($19,900) and Fibronics International, Inc. ($30,000), which multiplex Ethernet LANs running in parallel at their full 10M bit/sec. speeds onto FDDI backbones, may tide users over until prices fall. The bridgelike products give existing Ethernet users access to FDDI with no change to the workstation for about $2,000 to $2,500 per port.

Michael Howard, president of Infonetics Research, Inc. in San Jose, agreed that the prices will drop "soon." He added that this year's Interop show should spur attendees to consider FDDI technology more seriously, because "this is the best test of FDDI applications to date."

With Chipcom, all you need to reconfigure your network

is this simple tool.

Managing your company's network just got easier. Chipcom's ONline System Concentrator™ gives you a totally new dimension in freedom and flexibility for configuring and reconfiguring large, complex networks.

The unique TriChannel™ architecture of ONline supports not just one, but up to three separate Ethernets. Or any combination of Ethernet, Token Ring and FDDI networks. All at the same time, and all within a single ONline concentrator.

Integrated bridging and routing, and a sophisticated network management system allow moves, adds and changes to be made with fingertip ease.

Someday, perhaps, all networks will be as reliable, easy to manage and flexible as Chipcom's.

But for now, no one else can lay a finger on us.

For more information, call **1-800-228-9930.**

CHIPCOM™
Networking as it will be.

GSA# GS00K90AGS5185

Why Sybase Is The Standard On The Street.

© Sybase, Inc. 1990. Other company or product names may be service marks or trademarks of their respective companies.

Today, there's a powerful on-line RDBMS that's handling Wall Street's mind-boggling demand for real-time data and historical trading information.

An open RDBMS that integrates both transaction processing and decision support across multi-vendor networked environments, from micros to mainframes.

That RDBMS is SYBASE. And it's the choice of 18 out of the top 22 brokerage houses on the Street.

Our open Client/Server Architecture is the key.

With Sybase's Open Client interface, firms use a variety of familiar front end tools and applications like Lotus 1-2-3 and Microsoft Excel, plus SYBASE applications, independent software vendors' tools, and user-written applications.

At the same time, Sybase's Open Server seamlessly integrates hierarchical, network and relational DBMSs, third-party and legacy applications, and real-time data feeds like stock price quotations, into SYBASE applications.

In the real, multi-vendor world, SYBASE offers a unique return on your investment: an on-line RDBMS that preserves prior investments in both hardware and software.

Savvy firms like Merrill Lynch, Salomon Brothers, Shearson Lehman Brothers, and Fidelity Investments have taken advantage of that opportunity. And so can you.

To find out how, just invest a few hours in a free Sybase seminar.

Call 1-800-8-SYBASE for the seminar nearest you.

SYBASE

Client/Server For The On-Line Enterprise

For more information or seminar reservations, call 1-800-8-SYBASE.

X/Open expands user input

BY JEAN S. BOZMAN
CW STAFF

SAN JOSE, Calif. — X/Open Consortium Ltd. has decided to bring end users a bit closer to the specifications process. Last week, X/Open announced a new "open" policy to go along with its "open systems" approach to the marketplace.

Working through user councils and product reviews, the policy will directly involve end users from the initial requirements stage up until the final specifications of an X/Open standard.

The move, announced at last week's Interop '90 show here, is the latest step in X/Open's call for user input. Two user conferences, one held in Montreal in 1989 and one last May in Luxembourg, provided some precedent for the increased user role. X/Open works toward interoperability and open systems standards, often involving Unix systems.

Doug Michels, executive vice-president at The Santa Cruz Operation (SCO), a vendor of Unix-based desktop software, said more user involvement should nudge the X/Open process along. "So far, X/Open's outreach to users has been a three-day, once-a-year event," Michels said last week. "It's the right kind of thing to do, but those user conferences haven't been as detailed as I would have liked them to be."

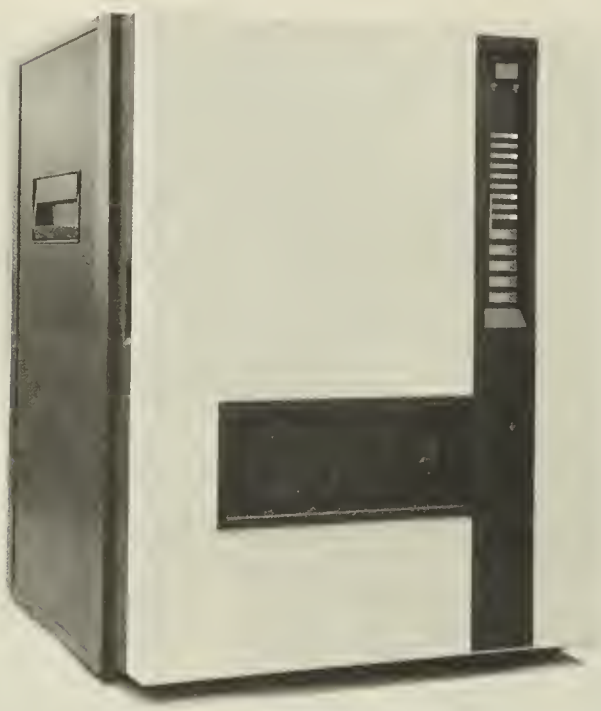
There has also been a two-year lag in the X/Open product cycle. X/Open's XPG 3 standard was announced in 1988 and given to vendors in 1989 but not shipped to end users until 1990.

"The way X/Open has worked [before] has been by developing specifications in closed working groups and then presenting them to the world," said Mike Lambert, vice-president and chief technical officer at X/Open. "We were building up [user] expectations before the platforms were even stabilized."

Vendor strength alone will not make the XPG 3 — or the forthcoming XPG 4, expected out in 1992 — catch on, industry analysts said. X/Open members include AT&T, IBM, Digital Equipment Corp., Fujitsu Ltd., Hitachi Ltd., Unisys Corp. and Sun Microsystems, Inc.

"It's one thing to have an operating system that is compliant with a standard," said Judith Hurwitz of Patricia Seybold's Office Computing Group in Boston. "But you're really talking to yourself if you don't have applications that are compliant or have users that write applications that are compliant."

Users already involved in the X/Open users' councils said last week that they are pleased with the change in policy. "We're talking to them about how our existing systems can be made to interoperate," said Tim Cutler, manager of information systems at Eastman Kodak Co.'s Kodak Park. "That doesn't mean that users are necessarily going to go on a spree of switching vendors, but it does mean we're going to base our purchase of computer products on the vendors' compliance with open systems."



T1 USERS

TRANSFER 6250 DATA AT 256KB OFF-LINE TAPE-TO-TAPE

Mitron's STD 6250 provides an efficient method for sending and receiving data anywhere in the world. STD 6250s communicate with each other and with other companies' bisynchronous terminals and computers.

The STD 6250 solves machine compatibility problems. It transfers data reliably without mailing tapes. It can communicate off-line to relieve an overworked computer.

STD 6250s transfer data at speeds up to 256KB. Double-buffering eliminates delays caused by read/write cycle times.

The STD 6250 can be leased or purchased.

STD 6250 features:
- Easy-to-install
- Needs no software
- Data rates to 256KB or faster
- RS-232 or V.35
- Dial-up or private line
- Multiplexers
- 6250 or 1600 bpi
- 1200′, 2400′, or 3600′ reel sizes
- Bisynchronous protocol
- Transparent or non-transparent
- Space compression
- Variable size records to 32,000 bytes
- Labels and multiple files

STD 6250 options:
- Asynchronous
- Code conversion
- Modem eliminator

Over 100 Megabytes per hour at 256KB

Since 1969, Mitron's magnetic tape systems have been used in a wide variety of data communication applications. For more information on how the Mitron STD 6250 can be used to send or receive magnetic tape data files, call 800 638-9665 (in Maryland, 301 992-7700)

MITRON
Systems Corporation
2000 Century Plaza, Columbia, MD 21044

Banyan unplugs network server

BY JOANIE M. WEXLER
CW STAFF

WESTBORO, Mass. — Shifting its marketing gears yet again, Banyan Systems, Inc. has decided to abort an 18-month, behind-the-scenes effort to develop a reduced instruction set computing-based, fault-tolerant network server — a move that will pare down the company's hardware staff by 40 people during the next nine months.

Banyan originally got into the server business "by default" to accommodate its Virtual Networking Software (Vines) network operating system, which distracted the company from its primary mission of providing networking software and confused the industry about the firm's strengths, according to Senior Vice-President James E. Allchin.

He added that the firm plans to pump the cash it saves from the abandoned development effort into porting Vines to hardware platforms other than Banyan's own CNS servers and the 40 additional platforms that are currently certified as Vines servers.

The company said it intends to expand Vines support across additional vendors' Intel Corp. 80286-, 80386- and I486-based computers, as well as Compaq Computer Corp.'s Systempro machines and clones.

CNS support pledged

However, Allchin said that Banyan would continue to produce, enhance and support its CNS line, although the company "will not step up its speed" if and when faster microprocessors begin to hit the market. "We'll provide hardware support for five years after the final CNS server ships," he said.

Allchin noted that four years ago, server sales accounted for 80% of the firm's revenue, a figure that has since dropped to one-third of Banyan's $100 million-per-year revenue.

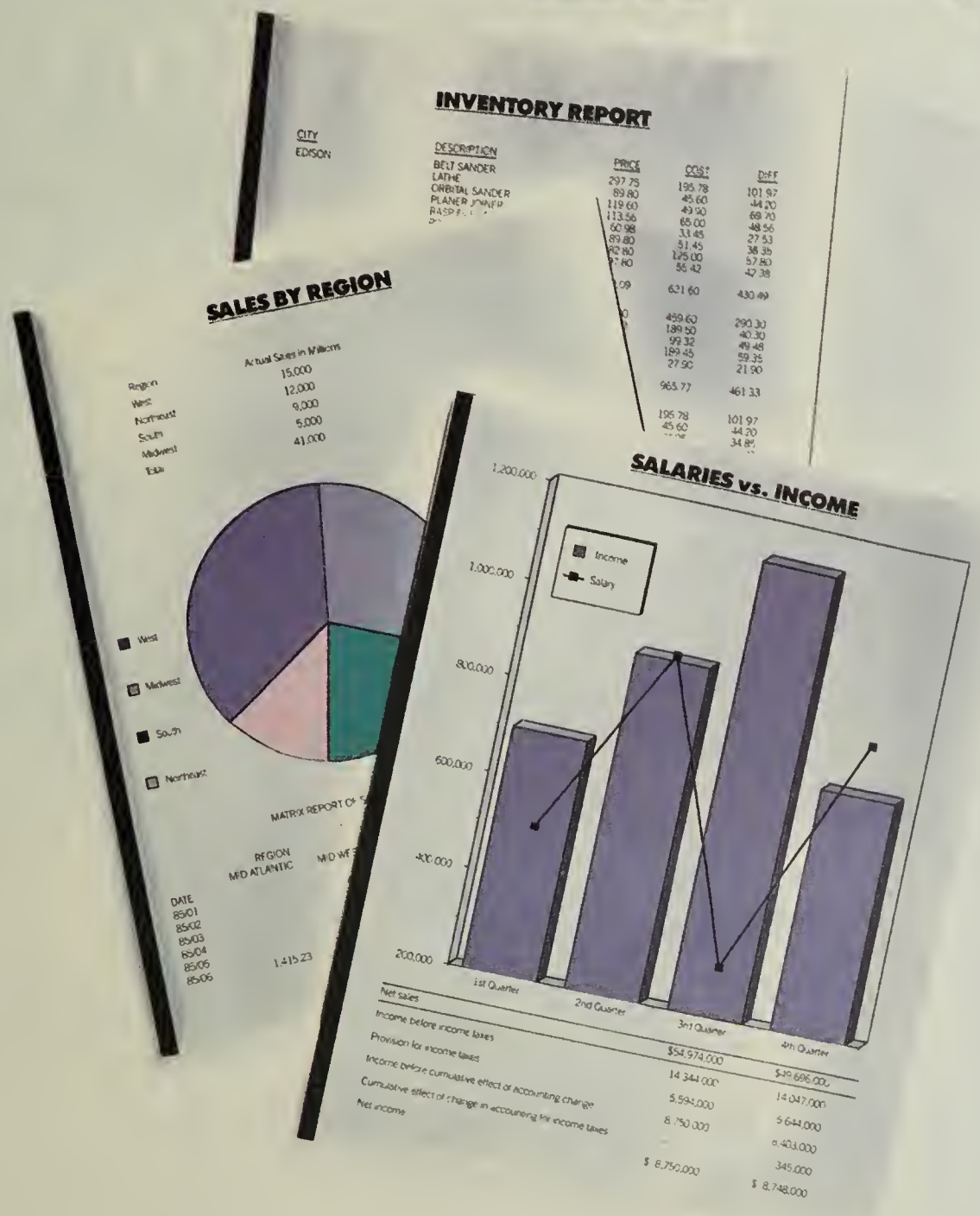
"We're a strategic software company," he said. "Let's face it — the margins are better in software."

FOCUS for DOS · OS/2 · LAN · TANDEM · UNIX · IBM Mainframe · DEC/VAX · AS/400 · HP · WANG · BULL · OS/2 · LAN · TANDEM · UNIX · IBM Mainframe · DEC/VAX · AS/400 · HP · WANG

BULL · OS/2 · LAN · TANDEM · UNIX · IBM Mainframe · DEC/VAX · AS/400 · HP · WANG · BULL · FOCUS FOR DOS · OS/2 · LAN · TANDEM · UNIX · IBM Mainframe · DEC/VAX · AS/400 · HP

INTRODUCING FOCUS FOR TANDEM

THE LATEST REPORTS ARE GOOD NEWS FOR TANDEM USERS.



The good news is now you can link multiple NonStop SQL tables with Enscribe files in a single report. And even convert and populate new tables from existing files.

Introducing FOCUS for TANDEM. The number one 4GL now works with Tandem computers, to provide you with the tools to build entire systems, using code generators, editors, screen and window painters, and security controls. You don't need to know SQL because FOCUS automatically generates the necessary syntax.

With FOCUS, you can also develop applications up to ten times faster than with COBOL, C and other 3GLs.

Your end users will be able to generate their own reports, graphs and queries from FOCUS' unique "point and click" TableTalk™ facilities. Without having to learn the FOCUS language.

And, as with all versions of FOCUS, your applications are portable between Tandem and all other major platforms. Such as IBM, DEC VAX, UNIX, and PCs under DOS, OS/2 and LANS. Existing FOCUS applications can now be moved to Tandem systems unchanged.

For more information, call us at 1-800-969-INFO. Outside the U.S., call 1-212-736-4433. Or write to Information Builders, Inc., 1250 Broadway, New York, NY 10001. We'll be happy to give you the full report on FOCUS for TANDEM.

FOCUS
Information Builders, Inc.

This advertisement refers to numerous software products by their trade names. In most, if not all cases, these designations are claimed as trademarks or registered trademarks by their respective companies.

DOS · OS/2 · LAN · TANDEM · UNIX · IBM Mainframe · DEC/VAX · AS/400 · HP · WANG · BULL · DOS · SUN · LAN · TANDEM · HP · BULL

Keep your users

*Suggested U.S. list price. Adobe and PostScript are registered trademarks of Adobe Systems, Inc. in the U.S. and other countries. ©1990 Hewlett-Packard Company PE12023

Introducing the new HP LaserJet IIID printer. The LaserJet printer for handling the high-volume requirements of the multiuser environment.

There's a lot for everyone to like and use. Two paper trays that let users easily switch between different types and sizes of paper. With each tray holding 200 sheets. Which means less reloading. Two-sided printing that allows your users to print their thoughts and reports on both sides of a page. And, if your people would like to say good-bye to feeding envelopes manually, they can—it's done automatically by our optional envelope feeder accessory.

Thanks to the same Resolution Enhancement technology found in the LaserJet III, dot sizes actually vary. So curves really curve. Lines are never jagged. And you get resolution never before seen in a 300 dpi printer. Output has never looked so good.

Of course, all types of options are available for all types of users. They can customize with Adobe® PostScript® software. Add memory. Or better express themselves with our MasterType library of fonts and typefaces. Even connect a Macintosh.

What *you'll* like is the reliability and service you've come to expect from Hewlett-Packard. And that the LaserJet IIID is available for only $3,595.* So call **1-800-752-0900, Ext. 1592** for more information on the new HP LaserJet IIID.

HEWLETT PACKARD

Hitachi and Motorola settle patent infringement dispute

The two firms agree to jointly withdraw pending court cases

BY MAURA J. HARRINGTON
CW STAFF

Making good on a promise made last June to reach an agreement, Japan's Hitachi Ltd. and Schaumburg, Ill.-based Motorola, Inc. reached a settlement on all of their outstanding intellectual property disputes regarding Hitachi's H/8 and H/16 microcontrollers and Motorola's 68030 and 88000 family of microprocessors.

Motorola issued a statement last week stating that it will jointly file a motion before the U.S. Court of Appeals for the Federal Circuit and the U.S. District Court for the Western District of Texas (the Austin Division) requesting the withdrawal of all pending cases involving the two companies' microcontroller and microprocessor disputes.

While neither company would comment on the specifics of the settlement, Michael Slater, editor and publisher of "The Microprocessor Report" said the settlement will probably not have any impact on users.

However, according to Slater, "Motorola achieved [its] goal in crippling Hitachi's marketing efforts of its H8 until it could get fairly close to coming out with a competitive product."

In his comment, Slater was referring to a decision made last March by Judge Lucius D. Bunton III of the U.S. District Court for the Western District of Texas in which he ruled that Hitachi's H8/532 microcontroller infringes on Motorola's patents.

Network General pulls Watchdog

BY JIM NASH
CW STAFF

MENLO PARK, Calif. — Network General Corp. is smarting after discovering that network technology can overshoot user needs.

Even as it announced enhancements to Sniffer, its high-end local-area network analyzer late last month, Network General pulled Watchdog, a low-end LAN monitor, off reseller shelves. Harry Saal, president and chief executive officer at Network General, said he had misjudged the network sophistication of companies with smaller LANs.

By week's end, the error had cost Network General significantly: Its stock bottomed out at $4.50 per share before rising again this week. While some of the slide can be attributed to a bear market, company sources acknowledged that the firm's decision played a significant part in the slide.

Greg Scott, computing services manager at Oregon State University's business school, said he gave Watchdog a four-day tryout and found it lacking. He complained about the device's front end.

"It had a really clunky user interface," Scott said. "In this day and age, it's a crime to be writing front ends that are so hard to use." He explained that overly structured layering slowed him down as he used Watchdog. Scott suggested that it should support Microsoft Corp.'s Windows and mouse applications.

Network General sought to expand its single product line earlier this year with Watchdog. Instead, it will end up spending at least $200,000 to buy back stock from resellers and defer production of new monitor software.

Watchdog off guard

Saal said that effective this month, the company will market Watchdog solely through manufacturers' representatives, along with the Sniffer analyzer. Watchdog, priced at $1,995, was targeted at companies with medium-size homogeneous networks as well as large multi-LAN corporations needing a monitor on individual networks.

Some companies at both ends of that spectrum will be hit by the retreat from resellers. The U.S. Geological Survey (USGS) has thousands of networked workstations, according to USGS computer engineer Richard Jenson. However, its Menlo Park site purchased three Watchdogs to monitor three key LANs. Jenson also purchased Network General's Watchmaster, a Watchdog-dedicated console, at the same time.

Network General has said it will put production of the console on hold to satisfy the monitoring demands of larger companies that do not need the console. Jenson said he has been forced to buy software and load it onto a workstation to take Watchmaster's place.

John Rohal, an analyst at Arthur D. Little, Inc., said he sensed confusion in the market and among users after seeing Network General's demonstration at Networld '90 Dallas.

"There was a barrage of messages about what users should want from Watchdog," Rohal said.

WHEREVER YOU SELL
WE PROVIDE
THE MAINTENANCE

If your next sales drive is in Europe, Systems Reliability is already there to support you.

As an independent company, we can offer you a tailored maintenance service for all your equipment - to the same high standards as you would specify yourself.

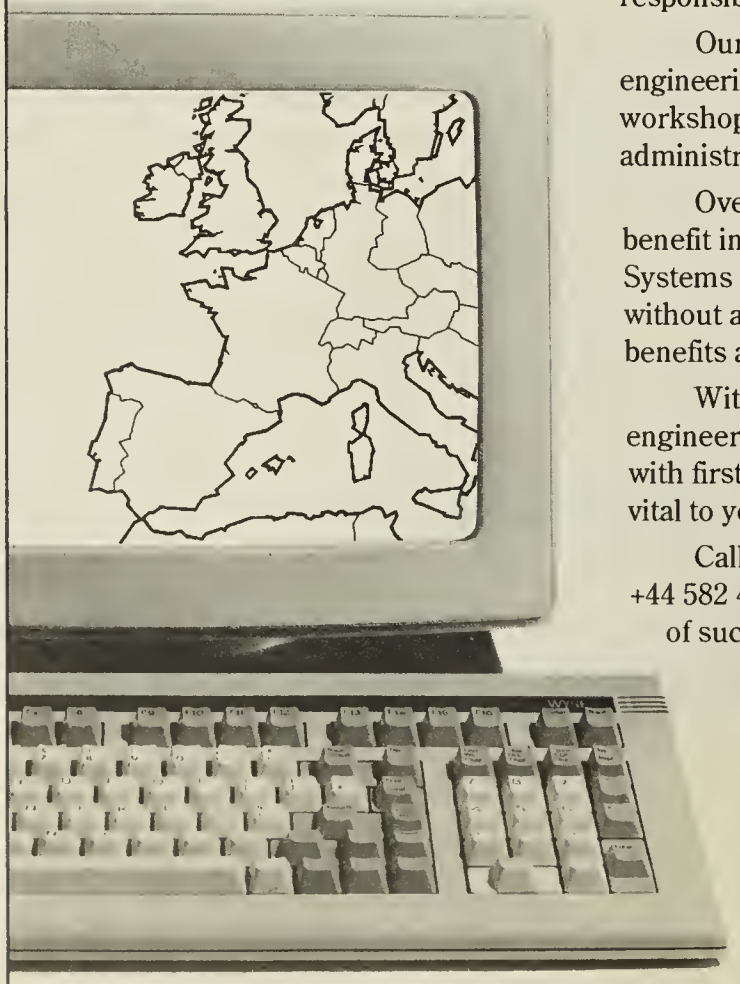
We take complete and overall responsibility, yet we're highly flexible.

Our package can include on-site engineering service for larger customers, a workshop repair service and full warranty administration to cut paperwork.

Over 7000 companies in the UK benefit independently from the services of Systems Reliability. For manufacturers without a recognised maintenance plan, the benefits are even greater.

With 14 regional offices and 150 engineers we can provide your customers with first class support. Such support is vital to your sales drive.

Call Greg Stone or David Ottewill on +44 582 482602 to increase your chances of success.



Systems Reliability

Systems Reliability Plc, 400 Dallow Road, Luton, Bedfordshire LU1 1UR United Kingdom.

The More Important Your Data, The More You Need The SAS® System.

Data as critical as yours demand the SAS System, the world's leading data analysis and presentation software. Whether you're projecting regional sales into the next quarter or economic trends into the next decade, you can't afford to risk your results — or your reputation — on anything less.

Only the SAS System gives you immediate access to over a hundred powerful, practical, *proven* tools for every conceivable application: data access and management . . . reporting and graphics . . . business planning, financial management, and decision support . . . project management . . . quality improvement . . . and applications development. And because the SAS System is modular, you can add new capabilities as your needs grow and change.

You'll also receive expert technical support, documentation, and training. All from SAS Institute Inc., the number one name in data analysis.

Yours for 30 Days . . . FREE.

Find out why world leaders in business, industry, government, and education rely on the SAS System. For a free 12-page SAS System executive overview, plus details about a no-risk software evaluation, give us a call at (919) 677-8200. In Canada, call (416) 443-9811.

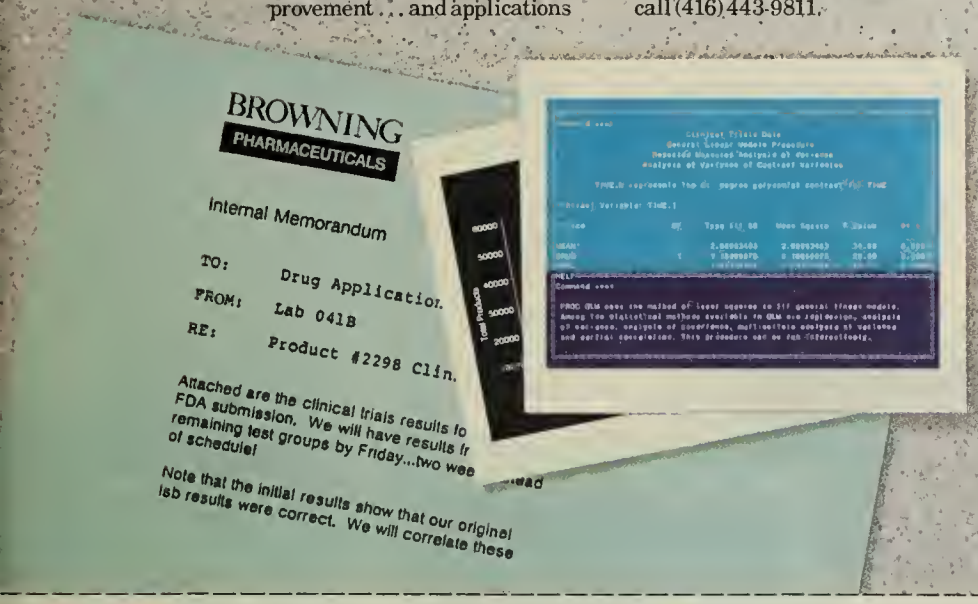
The SAS® System. More Choices for More Applications than Any Other Software.

SAS Institute Inc.
Software Sales Department
SAS Circle □ Box 8000
Cary, NC 27512-8000
Phone (919) 677-8200
Fax (919) 677-8123

The SAS System runs on mainframes, minicomputers, workstations, and personal computers.

SAS is a registered trademark of SAS Institute Inc.

Copyright © 1989 by SAS Institute Inc.
Printed in the USA.



The SAS® System Executive Briefing... Coming Soon to Your Area

Join us for the SAS System Executive Briefing. You'll learn how the world's leading applications system can help you exploit your organization's most strategic asset–data.

Designed for information executives, this free half-day session gives you a firsthand look at the SAS System's integrated applications...and shows you how to extend these applications to more users than ever before.

Plan now to attend 1990 sessions in the following cities:

CA	Irvine	Sept
	Sacramento	Sept
	San Diego	Oct
	San Francisco	Oct
CO	Denver	Nov
FL	Jacksonville	Nov
	Tampa	Sept
IL	Chicago	Sept, Oct, Nov, Dec
MA	Boston	Sept
MD	Rockville	Oct
MI	Detroit	Sept
MN	Minneapolis	Oct
NC	Cary	Oct, Nov
	Charlotte	Oct
	Winston-Salem	Oct
NE	Omaha	Sept
NJ	Edison	Nov
	Saddle Brook	Oct
NM	Albuquerque	Sept
NY	New York	Sept
	Poughkeepsie	Oct
OH	Cincinnati	Sept
PA	King of Prussia	Nov
	Pittsburgh	Sept
RI	Providence	Oct
SC	Columbia	Oct
TN	Nashville	Nov
TX	Austin	Oct
	Dallas	Nov
	El Paso	Sept
	Houston	Oct
	Midland	Nov
UT	Salt Lake City	Nov
WI	Madison	Dec
WV	Charleston	Oct

Canada

Montreal	Oct
Ottawa	Sept
Toronto	Sept, Oct, Nov, Dec

I would like to attend a free SAS® System Executive Briefing.

Please contact me with registration information for the Executive Briefing in (city) _____ in the month of _____

Name _____ Title _____

Company _____

Mailing Address _____

City _____ State _____ ZIP _____ Telephone (_____) _____

I will be using the SAS System on the following hardware _____ in these operating environments _____

My specific applications needs include: _____

Mail to: SAS Institute Inc., Attn: Executive Briefings SAS Campus Drive Cary, NC 27513

CW1015

For registration information, mail the coupon at left. Or, call 919-677-8200. In Canada, call 416-443-9811.

NAS. The pe
for an impe

Digital's Network Application Support (NAS) lets you integrate applications and share information across your multivendor environment.

Up to now, the dream of getting all your applications to work together has been just that – a dream. Digital's NAS now makes it a reality.

NAS is a set of software products for using and developing integrated applications running on different vendors' systems. While other computer companies are still wrestling with how to get their own computers to work together, Digital – a company whose computers have always worked together – offers a way to get your applications to work together. Even those running on systems that aren't ours. In fact, NAS works across the widest range of systems in the industry.

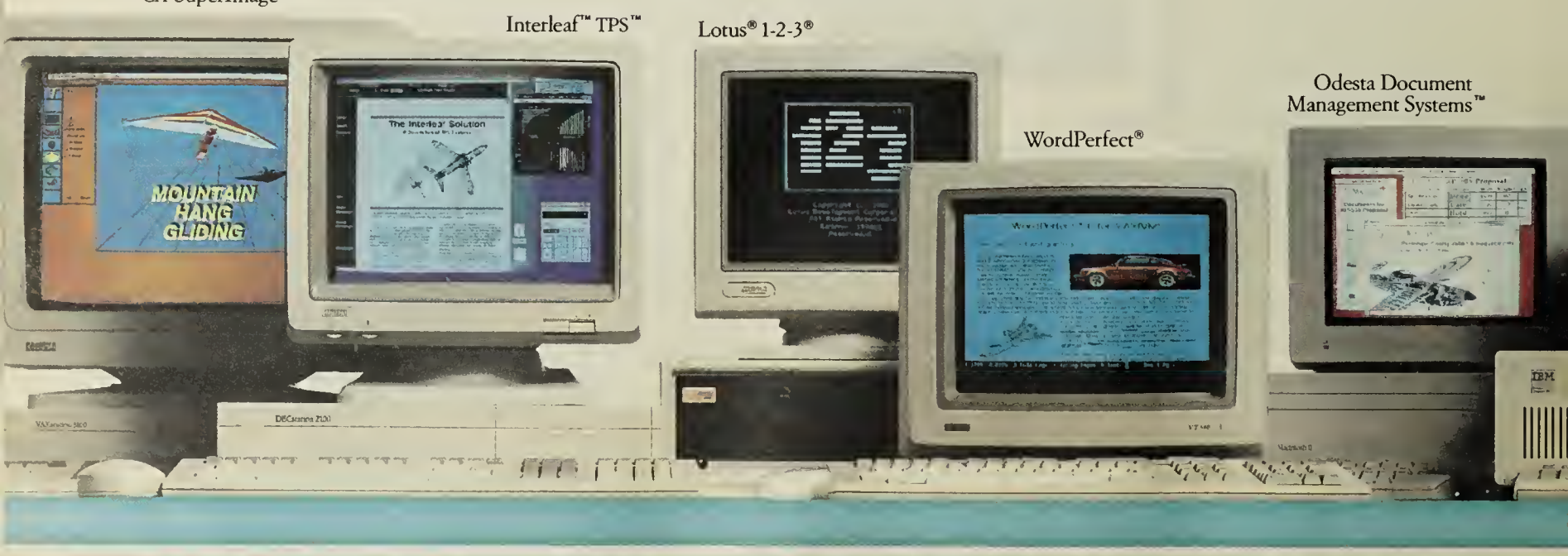
NAS. How it works.

Using a typical example, we'd like to show you one of the many ways NAS can be used in your real-world environment.

You can take graphics from an Apple Macintosh,® a Lotus® spreadsheet from an MS-DOS™ PC, a drawing from a UNIX™ workstation, data from an IBM® mainframe, a scanned image from the network and integrate them all into a single report. You can then send it electronically to others anywhere on the network, and even include up to the minute connections to source data. Sound easy? With NAS it is.

NAS. Why it works.

Achieving integration like this requires just the things Digital is very, very good at. Like networking. And



© Digital Equipment Corporation 1990. The Digital logo, Digital has it now, ALL-IN-1 and DECwrite are trademarks of Digital Equipment Corporation. Macintosh is a registered trademark of Apple Computer, Inc. Lotus is a registered trademark of Lotus Development Corporation. MS-DOS is a trademark of Microsoft Corporation. UNIX is a registered trademark of American Telephone and Telegraph Company. IBM is a registered trademark of International Business Machines Corporation. All other registered and unregistered trademarks above are the property of their respective holders.

digital™

rfect solution
rfect world.

software compatibility. And the adoption and promotion of open standards. Digital's leadership in these and other key areas is what makes NAS unique.

NAS. What it means to you.

Simply put, NAS gives you unequaled freedom of choice.

For IS managers, NAS means you can choose to grow in any direction you want. Also, the systems you chose in the past will work with NAS. So, your investment is protected.

For developers, NAS means you can write software once and know it will work on other systems. Savings in time and money can be substantial, allowing you to focus on improving your applications or reducing the backlog.

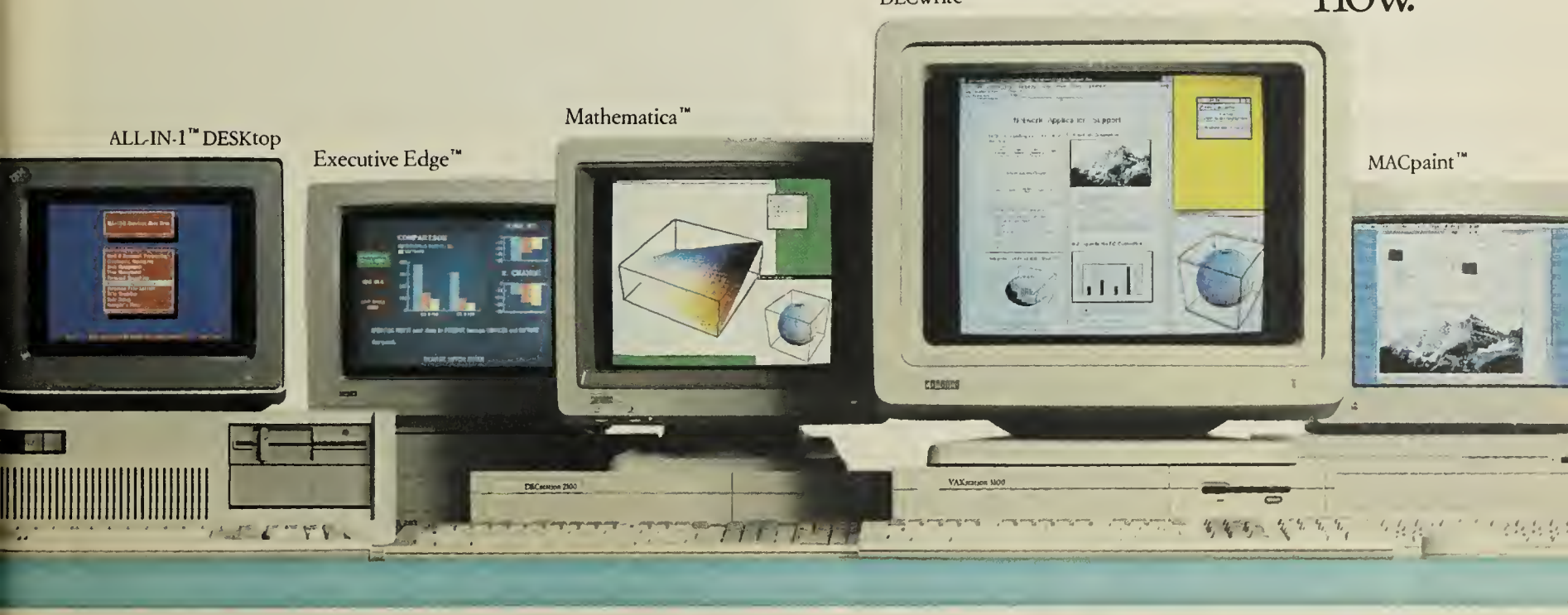
For users, NAS means you can continue to use the applications you're most comfortable with, but also be able to share information with others much more easily.

For the whole company, NAS means that with more computers working together, more people are working together. That, of course, means more productive workers and the ability to compete more effectively.

NAS. Available now.

Getting all your applications to work together is not some promise, somewhere down the road. NAS is here. Now. For more information on NAS, call 1-800-343-4040, ext. 376. Or call your local Digital sales office.

Digital has it now.



ADVANCED TECHNOLOGY

TECH TALK

Fast fiber splices

■ GTE Fiber Optic Products said recently it has a new fiber-optic splice available that will revolutionize the way fiber-optic cables are linked. Called the Fastomeric splice, the new product uses no adhesive or special tools for assembly, a major advance in fiber-optic splices, the company said. The splice is created simply by inserting prepared optical fibers into each end of the splice and snapping into place end caps marked with a fiber-cleave gauge.

LAN without wires

■ NCR Corp. said recently that it is the first major vendor to introduce a high-speed wireless local-area network interface card. Called the NCR Wave LAN, it transmits data at 2M bit/sec., more than nine times faster than any other wireless LAN now available, NCR said. The card is also compatible with Novell, Inc.'s Netware and features spread spectrum frequency technology, which features highly reliable and secure data transmission without interference or interception. The Wave LAN has a suggested retail price of $1,390 for the Network Interface Card, including Novell drivers and an omnidirectional antenna. An optional Data Encryption Standard feature sells for $90.

LCD patent in focus

■ In Focus Systems, Inc. said last week that it was awarded a patent for a high-resolution — 1,280 by 1,024 pixels or greater — monochrome LCD. Prior attempts of LCD makers to design high-resolution LCDs were hindered by inadequate refresh rates. In Focus solved the problem by stacking two 1,280- by 512-pixel LCD panels, using a process called interdigitating. Each panel contains alternating rows of active and inactive pixels that are staggered so that each active row aligns with an inactive row. Interdigitating the panels reduces the number of rows that must be refreshed by a panel.

Packing some sense into computers

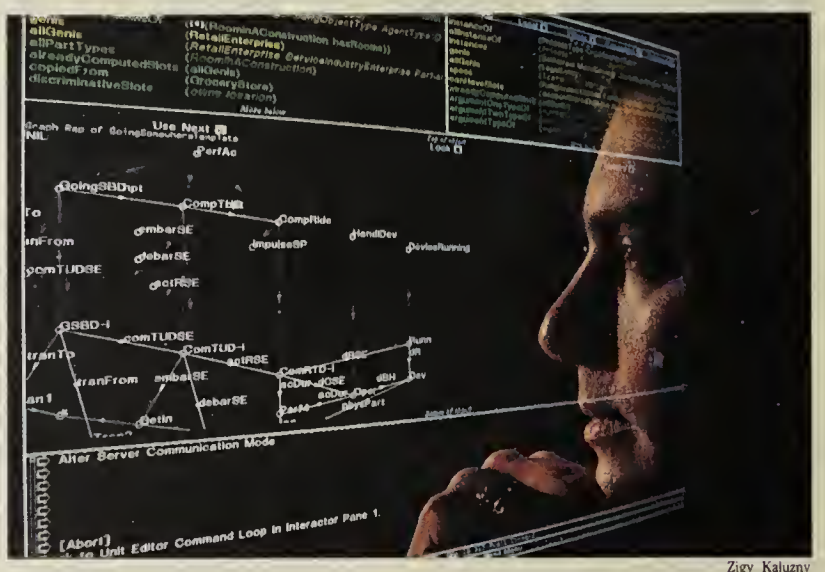
MCC works on a knowledge base of the things everybody — but machines — knows

BY GLENN RIFKIN
CW STAFF

When the film *2001: A Space Odyssey* appeared in 1969, it sent people's expectations of intelligent computers to a new and vastly higher level. HAL could not only compute, but could reason, conceive mischief and react to its environment with intelligence and cunning.

Since then, people have waited in great anticipation for computers to achieve a similar level of intelligence. Unfortunately, the great expectations for artificial intelligence have been tempered by the harsh reality that there are no shortcuts to building intelligence into machines.

In 1984, a young Stanford University-educated computer scientist, Doug Lenat, decided to manually construct a knowledge base for computers that would build common sense into software. Such concepts as "animals live for a single, solid interval of time" or "nothing can be in two places at once" are simply not available in machine knowledge. Lenat reasoned that computers needed access to general knowledge — knowledge that was so obvious that the encyclopedia omitted it — before these machines could approach useful intelligence.



Zigy Kaluzny

MCC's Doug Lenat *views his Cyc database of common knowledge*

What's missing?

"We're driven constantly by examples of what is not there rather than what is there," Lenat said from his office at Microelectronics and Computer Technology Corp. (MCC). "People fall back on general knowledge, but computer programs can't do that; they don't learn very well on their own. In fact, all avenues are closed to software today."

With that in mind, Lenat came to MCC and embarked on a 10-year project he called Cyc (from en-*cyc*-lopedia). The goal is to create a single, intelligent system whose knowledge base contains tens of millions of facts, beliefs, categories, relations and problem-solving methods that define our reality. Six years into the enormous effort, Lenat claims to be more than halfway to his goal and says that Cyc, which began with about a 10% chance of success, is now at a 60% or 70% chance of achieving its objective.

"Almost all software in the 21st century will be based on a platform of common sense," Lenat predicted. "It will be unthinkable to write a program not based on common sense."

Lenat and his team of researchers scan newspapers and magazines daily, along with scores of books and pamphlets seeking examples of what is not there — that is, the information that the writer assumed the reader knew. Armed with these countless bits of facts and assumptions, the Cyc team has developed a language (CycL) and a structure for the knowledge base.

Current expert systems, made up of a knowledge base and an inference engine, are brittle, Lenat said. They are unable to cope with unexpected situations, thus rendering most of the usable intelligence out of them. Cyc incorporates an ever-expanding knowledge base along with 25 inference engines. "Learning occurs at the edge of what you know; the more you know, the more you can learn," Lenat said. "This fact has held back machine learning for 20 years."

The painstaking task of manually embedding facts into Cyc will certainly take the project until 1995 and likely beyond. "Perhaps the hardest truth to face — one that AI has been trying to wriggle out of for 34 years — is that there's probably no elegant, effortless way to obtain that immense knowlege base," Lenat stated in a mid-project report. "Rather, the bulk of the effort must — at least initially — be manual entry of assertion after assertion."

The Cyc project exists with the financial assistance of companies such as Digital Equipment Corp., Apple Computer, Inc., Bellcore, Harris Corp., Eastman Kodak Co. and NCR Corp., all members of the MCC consortium. Each contribute $500,000 annually to the project, freeing Lenat from the pressures he would face in an academic environment. "This project was impossible to do in academia in the '80s," Lenat said. "No single company, not even one like DEC, would fund a multimillion-dollar project with a 10% chance of success."

At MCC, Lenat has had the luxury to spend what he terms "two person centuries" to create Cyc.

The first fruits of the labor are already transferring to MCC's shareholders. Bellcore is working on a customer adviser assistant that would give one of its member companies, US West, on-line advice for solving customer problems. DEC is developing its Sizer expert system based on Cyc.

John McDermott, head of DEC's AI research group, said customers often want to handle complex, specialized tasks and have difficulty determining the size of the system they are going to need. Because of the specialized nature of the problem, a customer cannot buy the solution off the shelf, so they now require a DEC sales representative to come in and spend several months analyzing the system's requirements.

Sizer will incorporate a large knowledge base with both specialized and commonsense information. It will allow a DEC salesman to make a qualified sizing estimate in minutes rather than months based on the parameters of the customer's needs. "A knowledge base will have gaps, so we need a system with common sense, one that can reason by analogy," McDermott said. "Cyc is a good tool for building up such a knowledge base."

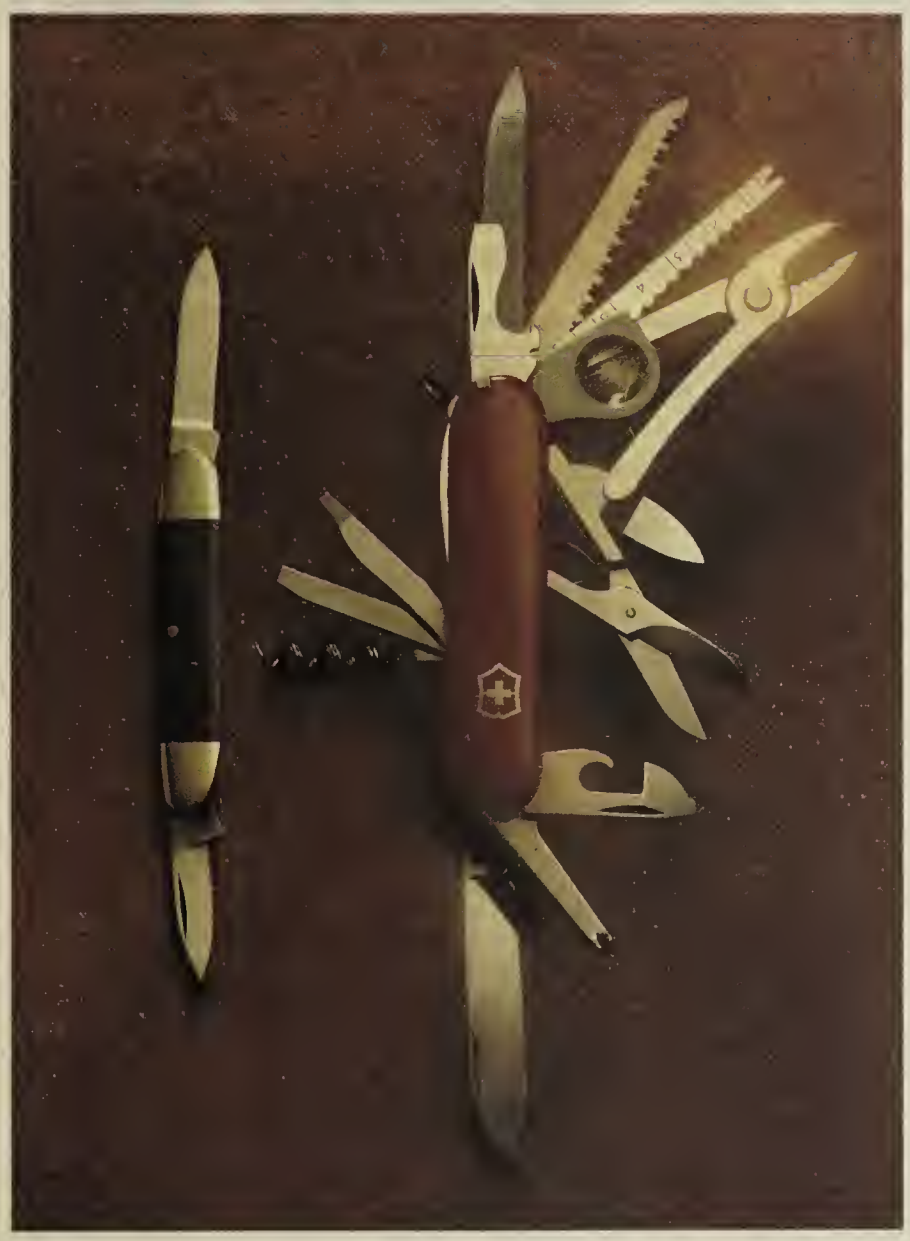
Self-adjusting

Eventually, Lenat expects Cyc to be able to program new information into itself automatically. Even today, the computer system on which Cyc is built spends each evening analyzing and "contemplating" the information it received that day. When complete, Cyc will contain 5 billion bytes of information — 10,000 times larger than a typical expert system today.

Most importantly, Lenat's work is considered "breakthrough" level technology. Gordon Bell, creator of the DEC VAX and currently chief scientist at Stardent Computer, Inc., said that Cyc "could provide the U.S. with a competitive advantage in the global marketplace. It could make MCC worthwhile all by itself."

Added DEC's McDermott: "Cyc is definitely a breakthrough project. Doug has defined the right way to go about using large amounts of knowledge. Just the fact that he is doing it is critical. Somebody has to."

Ordinary Session Management vs. TPX®.



Ever hear your users clamor for session management? Probably not. But just try to count requests for faster access to multiple applications and databases. And for integration of applications.

Your users need more than conventional session management. They need a tool that delivers timely information in a form that boosts responsiveness and productivity. They need a network tool that takes them beyond session management. They need TPX from LEGENT.

TPX goes beyond session management to provide the power of Application Integration and present information from multiple applications on a single customized screen. And TPX can provide SAA/CUA compliant panels as well.

But perhaps the most exciting aspect of TPX is its efficiency. With its modular, streamlined, multiserver architecture, TPX provides functionality with no compromise to overhead. You get the power you need without exhausting resources.

Find out why over 1800 data centers worldwide have already chosen TPX for session management... and a whole lot more. Contact your local LEGENT account representative or call 800-323-2600 (412-323-2600 in Pennsylvania). Free 30-day trials are available for MVS and VM environments.

TPX: Beyond session management.

© 1990 LEGENT
TPX® is a registered trademark of LEGENT Corporation.

LEGENT

EDITORIAL

Distant thunder

WHEN YOU CONSIDER that 75% of those who will be in the work force in the year 2000 are already in the work force, it is clear why we all should be concerned with what that work force will look like. After all, most of us will still be a part of it, perhaps holding professional managerial positions, too.

In the information systems area, the current thinking is that the demand for skilled professionals will outstrip the supply by a substantial margin, not only here but in Japan and Western Europe as well.

In the U.S., the facts are these: The overall labor force will grow only 1.2% per year in the 1990s — more than twice as slowly as the growth rate of the 1970s. The labor force in Japan and Europe will actually decline.

Fully 80% of the meager labor-force growth in the U.S will be composed of immigrants, minorities and women. Only 45% of the labor force in the year 2000 will be white males, whose numbers have dominated IS employment.

Meanwhile, on the education front, the number of college freshmen planning computer-related majors is less than half of what it was just eight years ago. Half of the MIS doctoral candidates in the U.S. are foreign students, who increasingly are returning to their native lands on completing their education.

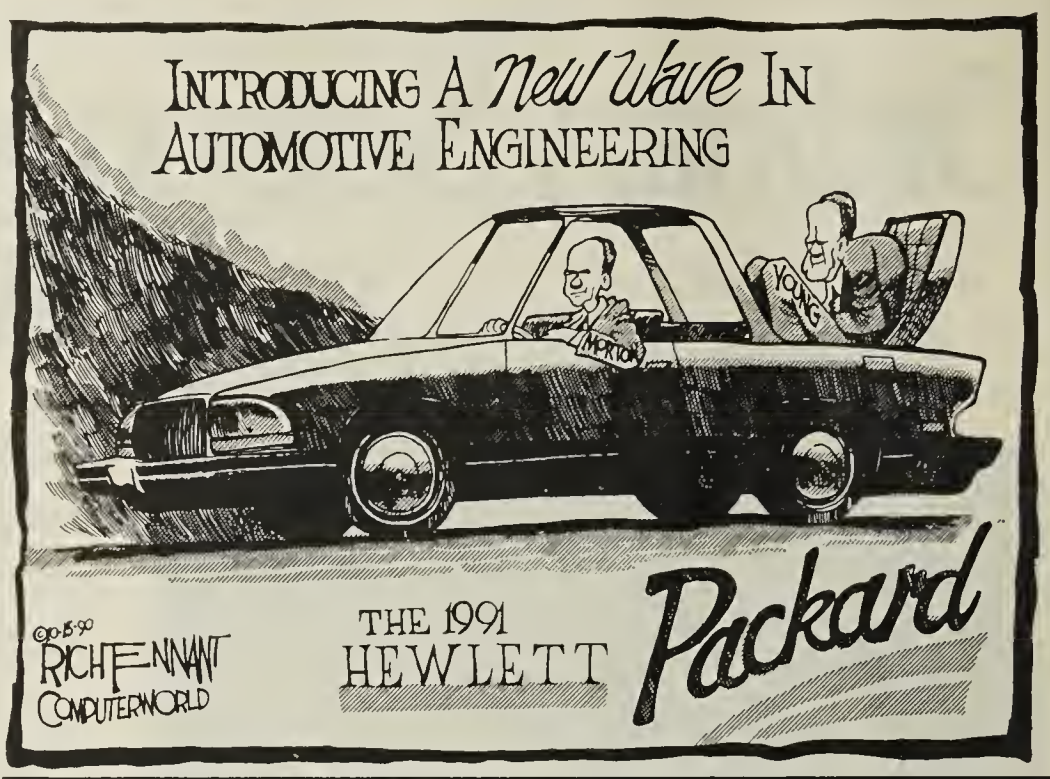
As a nation of government institutions and private companies, how are we responding to this looming crisis?

On the local level, our public schools are in turmoil. One 18-year-old in five is illiterate — *one in five*. Last year, a sample of 13-year-olds from the U.S. finished dead last in math, ninth in science and 11th in homework when measured against children from 11 other countries. Our kids finished first in one category — television viewing — by watching five hours or more of TV daily.

On the national level, the number of federally funded fellowships and traineeships fell from 60,000 in 1970 to less than 13,000 in 1986. In the last 10 years, the value of Pell grants, the major federal assistance program for undergraduates, has been cut in half. Measured in real dollars, the education budget of President Bush — the avowed education president — is smaller than President Reagan's budget of 1989.

If the threat of a shortage of IS labor isn't enough to scare you, consider what the beginnings of worker shortages are doing in Japan. According to Coopers & Lybrand's Tokyo office, new IS hires are demanding up to $16,000 *more* than existing staff, and wage increases among some IS titles are running at 20% per year.

As the federal government, several state governments and local communities across the land struggle with the worst fiscal crunch in memory, we must not lose sight of the future and that part of our destiny we still control. We must move beyond the rhetoric of politics and realize the tremendous stake we all have in facing a national crisis before it becomes a total national disgrace.



LETTERS TO THE EDITOR

DBMS downsizing

The real problem facing relational database management system vendors is that many prospects who used to be willing to pay $500,000 for a departmental computer and $50,000 for a RDBMS are deciding to buy a $5,000 personal computer and a $500 RDBMS instead. Some of them are the same prospects who concluded that buying a $5 million mainframe computer and a $500,000 RDBMS didn't make sense a few years ago when they could buy a departmental computer and RDBMS for a tenth the cost.

Just think: Customers of RDBMS vendors can buy a PC-based RDBMS for a hundredth of the cost of a departmental computer version. This represents quite a problem for any vendor, particularly when a company's overhead structure is geared to much larger, individual sales. Sales can slow down faster than expenses can be cut. It's like a plane in a deadly spiral. It's no fun, and there is no painless solution.

John J. Cullinane
President
The Cullinane Group, Inc.
Cambridge, Mass.

Language barrier

I read with interest the article "Beware the dark side of 4GLs" [CW, Aug. 27].

As a systems programmer who has installed and supported many vendors' fourth-generation language (4GL) offerings, I would like to add an additional caveat. In my experience, procedural languages, such as Cobol, Fortran and others, have ANSI standard versions at their cores. 4GLs, on the other hand, have only their individual vendor standards behind them.

I have found that each new release of many of the 4GLs currently available includes a thick stack of PTFs that needs to be applied to the new version if you want things such as field justification or translation to behave in the same way it did before the upgrade. In many shops that I have been in, this has led to the need to choose between applying the PTF and thereby neutralizing some gee-whiz new function or patching every 4GL application program in the system so that it will work according to the "new standard."

This has led to the decision in some shops to use 4GLs only for prototyping and quick-and-dirty applications. "Real" production applications are written in CICS, Cobol or some other "standard" language.

I think that it is unfortunate that vendors can't maintain upward compatibility, because 4GLs have many benefits and strengths.

Gregory A. Randis
Systems Programmer
Inglewood, Calif.

Name calling

I am writing for all the systems programmers who seem to have fallen through a large crack in your "Annual Salary Survey" [CW, Sept. 3]. Maybe you at *Computerworld* believe that those who call themselves systems analysts are really systems programmers undergoing analysis so they demand lower salaries. What exactly is an "operating systems programmer?" Do they work on OS systems? Haven't you heard about MVS? What about VSE?

I recently attended a "technical" third-party software vendor's educational course. When the 50 attendees listed their job titles, 45 called themselves "systems analysts," and all listed their duties as "technical" as opposed to "end user." I was the only "systems programmer" listed. Yet, when I asked a simple question on VSAM share options, the instructors and students demurred. They would "get back to me later on that one." I realized these were not the bits-and-bytes people I thought they were.

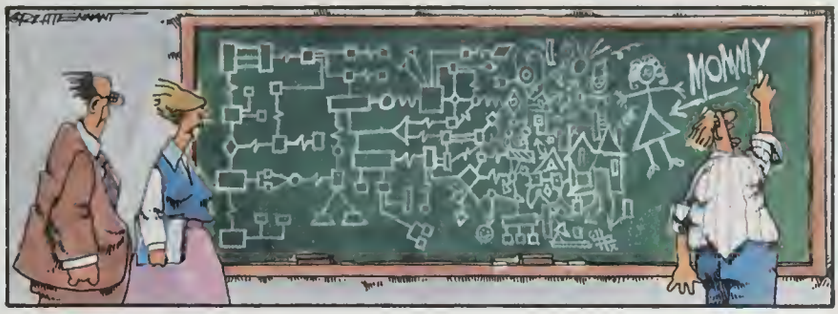
Where were your definitions of the job categories for the benefit of the nontechnical *Computerworld* reader? You may be assured that some of the job titles listed overlap, are ambiguous or generally cause confusion to the unindoctrinated.

We systems programmers are not systems analysts, although we seem to have been dumped in with them. Perhaps the systems analysts were the only ones not too busy to respond to your survey.

Those who can, do. Those who can't would probably like a nice job at *Computerworld* as a data processing specialist.

David L. Gallinson
Corporate Supervisor of Systems
Benjamin Moore & Co.
Montvale, N.J.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include phone number for verification.*



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $38.95* per year — a savings of 62% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government - State/Federal/Local
   - **65.** Communications Systems/Public Utilities/ Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - **90.** Computer/Peripheral Dealer/Distr./Reteiler
   - **75.** User. Other _____
   - **95.** Vendor Other _____

   (Please specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - **21.** Dir./Mgr. MIS Services, Information Center
   - **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev.
   - **32.** Programmers, Software Developers
   - **60.** Sys. Integrators/VARs/Consulting Mgt.

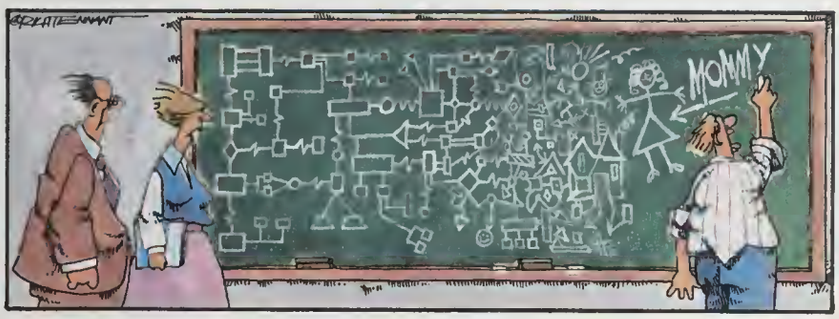
   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President, Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales & Mktg. Management

   OTHER PROFESSIONALS
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educator, Journalists, Librarians, Students
   - **90.** Others _____

   (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - **A.** Mainframes/Superminis
   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Local Area Networks
   - **F** No Computer Involvement

E4042F-6



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $38.95* per year — a savings of 62% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government - State/Federal/Local
   - **65.** Communications Systems/Public Utilities/ Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - **90.** Computer/Peripheral Dealer/Distr./Retailer
   - **75.** User: Other _____
   - **95.** Vendor Other _____

   (Please specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - **21.** Dir./Mgr. MIS Services, Information Center
   - **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev.
   - **32.** Programmers, Software Developers
   - **60.** Sys. Integrators/VARs/Consulting Mgt.

   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr
   - **12.** Vice President, Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt
   - **51.** Sales & Mktg. Management

   OTHER PROFESSIONALS
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educator, Journalists, Librarians, Students
   - **90.** Others _____

   (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant
   - **A.** Mainframes/Superminis
   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Local Area Networks
   - **F.** No Computer Involvement

E4042F-6

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

A whole new ball game

CLINTON WILDER

The Oakland Athletics' Tony LaRussa is considered a member of the "new breed" of baseball manager. Instead of the traditional hard-knock experience of years in *Bull Durham*-type minor league towns, LaRussa possesses a law degree. He has broken the mold of the tobacco-chewing, go-get-'em-boys dugout denizen with a reputation for intelligence, preparedness and an insatiable appetite for strategic information.

He is also the best manager in baseball today and will be leading his As into their third straight World Series tomorrow night.

In the IS world, a new breed of successful manager is also emerging — younger, more business-savvy and increasingly aware of the forces far from the data center that shape a company's success or failure. These new managers may have backgrounds in consulting, marketing, finance, manufacturing or strategic planning. Increasingly, many of them are women.

Like a newly appointed baseball manager, they usually arrive with a mandate for change. The old ways of managing IS — the things that made a company successful in the past — don't work anymore. The options of downsizing, decentralizing and outsourcing, anathema to some tradition-bound IS shops, are high on the agenda of the new manager. Not necessarily to implement but certainly to consider.

Although LaRussa is the best example of the new breed of baseball manager, he is not alone. Look among baseball's most successful teams, and more often than not, you'll see this new type of manager: young, intense, perhaps less colorful than the crusty skipper of old but also more cerebral.

Both division-winning National League managers, Pittsburgh's Jim Leyland and Cincinnati's Lou Piniella (in his first season with the team), are also examples. Current White Sox manager Jeff Torborg, a favorite to win Manager of the Year honors for leading a team of young unknowns to baseball's third-best record, is another good example.

Appropriately, too, these managers are themselves computer-literate. LaRussa, Torborg, the Texas Rangers' Bobby Valentine and others are noted for their use of PC databases to analyze pitching matchups, pinch-hitting decisions, placement of fielders and scores of other strategic factors that can turn losses into wins.

It doesn't always work — baseball PC pioneer Davey Johnson was fired as the New York Mets' manager this year — but it does exemplify an innovative approach to the Grand Ol' Game.

Niculae Asciu

This is not to say that every company needs new blood in IS management. In baseball, there are several highly successful old-line, old-school managers: Tommy Lasorda in Los Angeles, Roger Craig in San Francisco, Joe Morgan in Boston, Sparky Anderson in Detroit. Their style continues to work well in their respective organizations, and major-league baseball franchises can be as different from each other in corporate culture as Apple is from IBM.

IS management is becoming like baseball management in another way: job security. A losing record, or a failed systems project, is not always the reason for a firing — clashing with the established corporate culture can also do it. New York Yankees managers have an even shorter job life expectancy than CIOs.

And how about dealing with the skills shortage? Top-notch pitchers and catchers are becoming as scarce as crack global network managers or C++ programming whizzes. Of course, big bucks are important in attracting them — but so is having a stable organization and a manager with a reputation for treating "players" with respect while getting top performances out of them. Just ask Rickey Henderson to compare the Oakland clubhouse atmosphere with the one he left behind in the Bronx.

Like many a successful IS manager, LaRussa has the benefit of working for perhaps the most progressive organization in baseball today. Harvard-educated Oakland general manager Sandy Alderson has engineered a dramatic turnaround of the team's fortunes both on and off the field — a strong high-level executive sponsor if there ever was one. I wouldn't be surprised if he uses a PC, too. On the other end of the spectrum, there is (or was) George Steinbrenner.

More than any other professional sport, baseball thrives on the use of information for competitive advantage. Sure there's no substitute for talent; if a Roger Clemens or Dave Stewart is "on," all the right strategy in the world isn't going to come close to beating him.

But consistently having the right batter at the plate or throwing the right pitch in a game-deciding situation will separate the successful teams from the also-rans.

In baseball, as in business, the manager who uses the best data to make the most effective decisions will come out on top in the long run. And the new breed, in baseball and IS, is proving that to be truer than ever in the '90s.

In fact, that's why they're called *managers*.

Wilder is *Computerworld*'s senior editor, management and a former sports-writer.

Aspiring managers: Don't flatten any ducks

MICHAEL COHN

If you are an information systems manager, skip this article. Please flip to another page. Catch up on Systems & Software. Go ahead and peruse the Careers section.

Only nonmanagers should read on. I'm quite serious about this. Yet I suspect a few managers are still sticking with this piece.

Stop reading it! You won't be interested! It's a very technical discussion about denormalizing relational tables.

There, that should have scared them off. Now for the rest of us . . . have you ever wondered why those folks are managers while we remain aspiring nonmanagers?

It's got nothing to do with experience or talent or marrying the chief financial officer's overweight cousin. However, if the CFO's overweight cousin is available, a couple of dates might not be a bad idea.

What really matters in crawling your way up the management ladder is learning to speak management lingo.

Don't waste your time with buzzwords and acronyms. Don't try to sound intelligent; people will expect you to code something.

If you want to *be* in management, you have to *sound* like management.

Now don't get worked up about this. Don't fork over 40 grand for an MBA. I've saved you all that pain and suffering by listing below the hottest management phrases bouncing around the boardroom today.

Memorize them! Of course, they're not as exciting as "Stop the presses!" or "Is there a doctor in the house?" but you'll knock the socks off the chief information officer at the next big meeting.

Come to think of it, I did once get to yell, "Is there a doctor in the house?" in a crowded restaurant. Three people came running . . . they were lawyers.

- **Let's take that off-line.** If you want to be an IS manager, keep this phrase in your arsenal. It comes in particularly handy when you've just come up with this great idea, called a meeting about this great idea, told everyone about this great idea and then someone brings up a point that makes you look like an idiot.
- **Get everyone on board.** In IS, it doesn't matter if your idea is good or bad. As long as "everyone's on board," you really can't get into trouble, but when everyone's not on board, it's a bad thing.

Some folks are busy getting their feet wet. Some are in hot water. Still others are in over their heads. These guys are probably not on board. Some people get on board who you really wish were overboard. Most often, people miss the boat altogether.

- **What's the bottom line?** You hear this a lot when a meeting has run over by 10 minutes. IS managers are too sophisticated to say, "Get to the point, Chuck," or "Put a lid on it, Chuck." Instead, they say, "What's the bottom line?" Then you and Chuck and everybody else hurry off to the cafeteria before they stop serving frozen yogurt.
- **I hate to say "I told you so."** In management lingo, this means the same thing as "I told you so."
- **I'm just playing devil's advocate.** IS managers are not allowed to argue with people and call them funny names. That's considered unprofessional. But if you first say, "Look I'm just playing devil's advocate," then you can use any funny names you want.

To be on the safe side, only play devil's advocate with people a lot smaller than you.

- **The best-case scenario.** IS managers talk about this all the time, especially when they're trying to get you to work on something.
- **The worst-case scenario.** IS managers talk about this all the time, especially after you've started working on something.
- **Let's not reinvent the wheel.** IS managers are ready with this when they're asked to do a bunch of work. It's the same as saying, "We did that before, let's not do it again."

Of course, it's also the same as saying, "We did that before, and boy did we screw it up." IS managers hope no one can tell the difference.

> IS MANAGERS ARE too sophisticated to say, "Get to the point, Chuck," or "Put a lid on it, Chuck." Instead, they say, "What's the bottom line?" Then you and Chuck and everybody else hurry off to the cafeteria before they stop serving frozen yogurt.

- **First thing in the morning.** This phrase describes how IS managers tackle all of the tough problems that come up just before bowling league.
- **Ducks in a row.** Don't be confused by this phrase. IS managers don't really chase ducks around the office trying to get them in a straight line. Nowadays, you can go out and buy them that way.

When IS managers are about to go live with a really big system, this is the way they get ready.

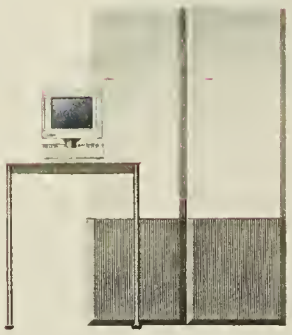
- **Rubber meets the road.** This is when IS managers find out if they were ready. Usually, when the rubber meets the road, it flattens all their ducks.

Cohn is trying to be a computer salesman in Atlanta.

Integrated information from
to give you control by giving

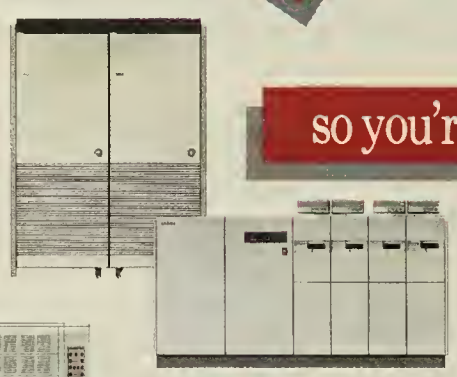
It is a comprehensive

so broad you're free to integrate information

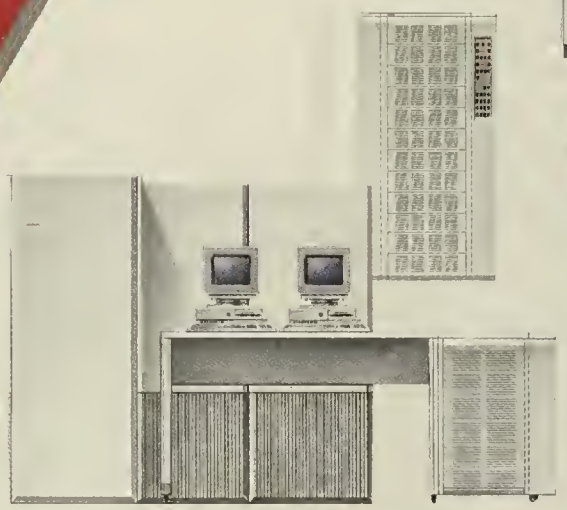


It is a truly open initiative

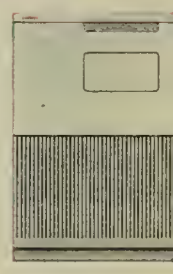
so you're free to integrate Unisys



It is a standards-based



so flexible you're free to protect past investment



See us at INTEROP, Booth #406

Unisys. A framework you freedom.

Every enterprise runs better when information runs freely to the people who need it most. That's why you need a computer company that gives you freedom to integrate all the information you work with. And that's why integrated information is the guiding principle of the Unisys Architecture.

Our architecture is designed to give you an open information network that turns isolated information sources into a single resource. It's the first one to take open system standards and apply them across the board to all levels of computing, from workstations to departmental servers and mainframes—and to create an enterprise-wide network.

That means productive interoperability. It means freedom to share network services; share files and data among multiple platforms; move applications between platforms; and benefit from the consistency of applications and training across an open information network.

Many of the systems and software products to start you down this road are here today. Many are yet to come.

Our goal is clear: To give you the greatest freedom of choice in a multi-vendor environment. The freedom to integrate what you have with what you need. The freedom to stay competitive. So call 1-800-448-1424, ext. 48. And see how good freedom can be.

© 1990 Unisys Corporation.

UNISYS

We make it happen

Waste Management, Inc., is making the world a more beautiful place. And we're proud to pitch in.

Beautiful landscapes. Unspoiled vistas. For years, protecting the environment has been the business of Waste Management, Inc. And they reached the top because one thing was always clear–nobody beat them in customer service.

But when their business grew from $650 million to $4.5 billion in less than 10 years, the burning question was: Could they be big and still be the best?

Software AG had the answer.

With our ADABAS and NATURAL application development environment, Waste Management is able to maintain their high level of customer service with their rapid expansion.

"The power of NATURAL is that it enables us to prepare each of our five hundred field locations for a massive increase in transaction processing," says Ed Bacom, V.P.-Finance, North America Group. "And because it allows us to custom design the system for each operation, we're able to pinpoint the special needs of our customers and fulfill them."

Today Waste Management continues to grow. They are the largest supplier of disposal and recycling services in the world, and still number one in customer service. That's good news for us. Because only when our customers attain success, can we say the same for ourselves. For more information, call 1-800-843-9534. (In Virginia, call 703-860-5050. In Canada, call 519-622-0889.)

Your success is how we measure ours.

SOFTWARE AG

© Copyright 1990, Software AG. NATURAL and ADABAS are trademarks of Software AG.
Waste Management is a registered trademark of Waste Management of North America, Inc.

COMMENTARY

Maryfran Johnson

The one to watch

IBM is turning its gigantic gaze on a technology that IS folks ignore at their peril: geographic information systems, or GIS.

Starting out years ago as the mainframe-oriented province of government engineers and scientists, oil companies and natural resource managers, GIS is the catch-all term for the hardware, software and services involved in gathering and managing geographic or spatial data.

Today, GIS applications run on powerful graphics workstations and high-end personal computers. They can be as basic as a database of ZIP codes or street addresses or as complex as satellite imagery or digitized maps of major cities.

"I would tell MIS managers that if they haven't seen GIS yet, it's not a matter of *if* they will but *when* they will," said Glenn Montgomery, president of GIS Research in Englewood, Colo. "IBM is really pouring jet fuel into this."

Since 1988, IBM has been focusing greater resources on developing GIS applications and is only now recovering from its reputation of indifference to the field. The computer giant cemented new business alliances with leading GIS vendors such as the Environmental Systems Research Institute, TYDAC Technologies and Geovision, Inc. This year, IBM opened an additional six GIS Solutions Centers in the U.S., bringing the

Continued on page 36

IBM restates it has a way to go

Users left to wonder when multiplatform distributed databases will ship

BY ROSEMARY HAMILTON
CW STAFF

IBM recently dropped another hint that the reality of a full-blown distributed database environment is years away.

Larry Morgan, a senior programmer at IBM's Santa Teresa Laboratory in San Jose, Calif., said in an interview recently that the OS/2 and OS/400 capabilities will be available "around the time frame" that the distributed mainframe database capabilities begin shipping.

The problem is, no one knows when that will be. In September, when IBM announced the DB2-to-SQL/DS distributed feature, it announced no shipping date. Instead, it said it would announce an availability date before September 1991.

Nonetheless, Morgan's schedule gives a slight boost to the OS/2 and OS/400 platforms, both of which have been on the sidelines of most recent IBM distributed database developments.

While IBM has had both SQL/DS-to-SQL/DS and DB2-to-DB2 capabilities on the market for more than a year, it had announced nothing specific for OS/400.

Earlier this year, it announced an OS/2-to-OS/2 feature but still had not specified when it would connect the workstation platform to the bigger databases.

Blame it on the database

George Zagelow, director of architecture and standards at the Santa Teresa lab, said that OS/400 developments have been slow because the database was the least up-to-date of the four Systems Application Architecture (SAA) databases on IBM SQL standards.

"SQL/400 had the biggest hurdle to jump," Zagelow said. "They are still pulling hard, and they have products coming."

Morgan said IBM is prepared to announce like-to-like and any-to-any capabilities for the OS/400 platform and links to host database systems for OS/2 in the time frame he indicated.

The like-to-like capability is the easier technical challenge and gives one database access to other like databases. Currently, some users are exploring the DB2-to-DB2 capability, which allows them limited access among DB2 databases.

The any-to-any feature is a more complex goal. It will eventually provide a so-called seamless SAA database environment. The idea is to allow a user in one of the four SAA databases to request and receive data that resides in any of the other SAA databases. The user need never know where the data actually resides.

FEATURE: USER/VENDOR RELATIONS

Will CDC customers take flight?

BY BARBARA DEPOMPA
SPECIAL TO CW

The 1980s were no picnic for Control Data Corp. as the company struggled to consolidate after years of overdiversification. The 1990s may not be any easier as the Minneapolis-based firm tries to calm a customer base made skittish by uncertainty about both the company's future and the sluggish U.S. economy.

Because CDC has consolidated, sold off or discontinued many of its businesses, there is concern among customers about the long-term viability of CDC products, such as its Cyber mainframes and the aging, proprietary NOS/VE operating system, according to Charles Casale, an analyst at Boston-based Aberdeen Group and a CDC veteran.

CDC is countering this concern with a plan to migrate its current Cyber mainframe customers to a Unix-based hardware platform by the mid-1990s, according to Jim Ousley, president of CDC's Computer Products Division. In keeping with the computer industry's growing standards push, CDC has unveiled systems developed by Mips Computer Systems, Inc. that feature reduced instruction set computing-based Unix processing.

Fran O'Neill

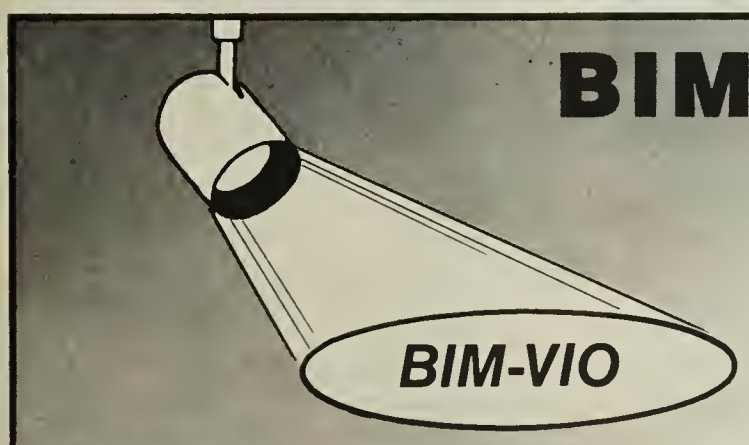
The company has also targeted future developments at the scientific/engineering arena and foreign markets, lessening its head-on competition against IBM in the general commercial computer market, Ousley says.

Most users say they are waiting CDC out because of the investment they have in the firm's technologies.

"We have a huge investment in applications that were developed in-house on the Cyber systems," says Arnold Acedo, manager of computer services at the Garrett Engine Division of Allied Signal Aerospace in Phoenix.

Garrett Engine plans to maintain its current roster of two Cyber 990s, a

Continued on page 34



BIM Spotlight

***PROBLEMS:** The DOS/VSE Label Area is a performance bottleneck. Slow disk, relative to CPU, limits performance.*

***SOLUTION:** BIM-VIO–The DOS/VSE 'VIRTUAL' Disk Drive and Resident Label Area Product.*

BIM-VIO creates a "Virtual" Disk Drive in the VIO area of DOS/VSE/SP. Since this area is in virtual storage, references to it are satisfied at CPU speeds and no actual disk I/O takes place. The net result is a potentially significant performance improvement of programs using disk files that have been moved to this area.

A built-in feature of the product is that the DOS/VSE Label Area is relocated to the virtual disk. This area is one of the most frequently accessed in most DOS sites, so moving it to the virtual disk should result in significant performance improvement to the overall system, regardless of any other specific use of the virtual disk capability.

Call for full documentation or free 30-day trial. Price: $4000, $2000/yr, or $200/mo.

BIM® B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436
612-933-2885
Fax 612-933-7764
Member Independent Computer Consultants Assn

BIM has over 20 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

The IEF™ can help you devel unprecedented quality, prod

"The IEF is a superior tool for implementing Information Engineering because it integrates the entire process from planning through code generation. We're deploying the IEF throughout the corporation."

David V. Evans
Vice President
Director, Information Systems
J.C. Penney

"Our On-line Banking system has been in production for more than 12 months—500,000 transactions a day—without a single code failure. And we had very few enchancements to do. Our users got what they needed the first time out."

Mark Quinlan
Senior Programmer/Analyst
Huntington National Bank

"To meet the dramatically reduced time-to-market requirements for our products, we need high-quality systems that can be changed fast. That's why we've chosen the IEF as the CASE solution for our entire organization."

John Pajak
Executive Vice President
Mass Mutual Life Insurance

"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity —the specification always matches the executing system."

Paul R. Hessinger
Chief Technology Officer
Computer Task Group

"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

John F. Mott
President
AMR Travel Services

"Our users were extremely pleased when we finished our first project—a 60-transaction system—in one-half the budgeted time. We had tried interfaced CASE tools without success. IEF integration makes the difference."

Giorgio Sorani
Division Head – MIS
Lubrizol

"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development.."

Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce

"We used the IEF to rebuild our aging Frequent Flight Bonus system. With DB2 tables of up to 52 million rows, we needed high performance. And we got it...98% of our transactions complete in less than 3 seconds."

Cloene Goldsborough
Director of Data Resource Management
TWA

"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

op information systems with uctivity and maintainability.

The success of Texas Instruments CASE product is proven—in the field.

Major companies have used TI's CASE product, the Information Engineering Facility™ (IEF™), for everything from rebuilding aging high-maintenance-cost systems to development of new enterprise-wide strategic systems.

Study shows zero code defects.

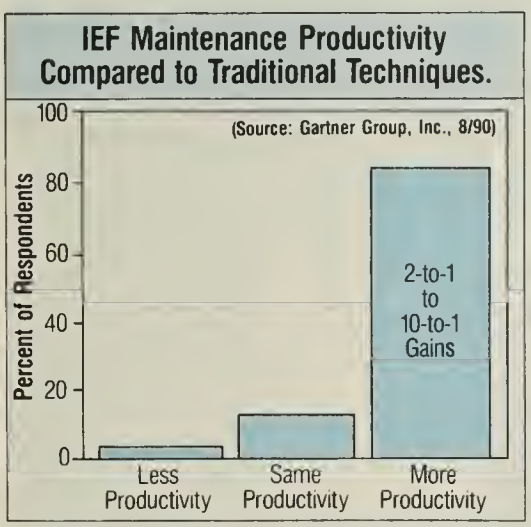
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) *IEF developers reported zero defects—not one abend had occurred in IEF-generated code.*

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, *more than 80 percent had experienced gains of from 2-to-1 to 10-to-1.* (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

Mainframe applications can be developed and tested on a PC.

With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

More environmental independence coming soon—develop on PC, generate for DEC/VMS, TANDEM, UNIX.

The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC, and CICS) since early 1988. Soon you'll be able to develop systems in OS/2 and then automatically generate for other platforms. DEC/VMS, TANDEM and UNIX are scheduled for availability in 1991. More will follow. We are committed to increased environmental independence in support of the Open Systems concept.

We are committed to standards.

IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's Cohesion—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

Full-service support.

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

For more information, including a VHS video demo, call 800-527-3500 or 214-575-4404.
Or write Texas Instruments, 6550 Chase Oaks Blvd., Plano, Texas 75023.

TEXAS INSTRUMENTS

© 1990 TI
Information Engineering Facility and IEF are trademarks of Texas Instruments. Other product names listed are the trademarks of the companies indicated

66106

NEC modems keep information moving as if your life depends on it.

In a 911 emergency, to risk a communications breakdown is to risk a life. So if you don't want to take any chances, make sure your modem can handle the pressure in a crisis.

In Florida, NEC's I Series Intelligent Chassis System is now helping coordinate the life-saving efforts of Lake County's 911 services. The county chose the system after tests found NEC's I-Chassis modems outperformed others. And they've proved their round-the-clock reliability by being on the job there for more than a year without a single failure.

Since NEC modems are designed to rapidly and accurately transmit huge volumes of data, Lake County's 911 operators can now quickly pinpoint accident locations, provide traffic instructions, find patient medical records, and dispatch back-ups when needed. And because NEC's Dual Modem Card links 911's control center to NEC Dial-up Modems in remote locations, Lake County feels it has found the best data networking solution attainable.

Each individual I Series Chassis supports a wide variety of applications and products. These include synchronous and asynchronous operation in dial-up or leased line networks. Line speeds ranging from 300 bits/s to 56k bits/s with both analog and digital capabilities. As well as compatibility with CCITT standards such as V.32 and V.42/bis. Plus, the system's built-in flexibility eliminates product obsolescence by making it easy to add, mix, and match other chassis and data communications devices as network requirements change.

No matter what business you're in, you need a modem that can keep facts and information on the move without causing a crisis of confidence. So choose wisely. Choose NEC's I Series Intelligent Chassis System and Network Manager. For a free assessment of all your data networking needs, **call (800) 222-4NEC.**

© 1990 NEC America, Inc.

NEC

GET THERE FIRST.

Subscribe to COMPUTERWORLD, and be among the first to read about the hottest news in the information industry. 51 issues for just $38.95.* Act now!

First Name MI Last Name

Title Company

Address

City State Zip

Please answer questions to qualify for this rate.

1. BUSINESS/INDUSTRY (Circle one)

10. Manufacturer (other than computer)
20. Finance/Insurance/Real Estate
30. Medicine/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government - State/Federal/Local
65. Communications Systems/Public Utilities/ Transportation
70. Mining/Construction/Petroleum/Refining/Agric
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Distr./Retailer
75. User Other _____
95. Vendor Other _____
(Please specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT
19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
21. Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt., Dir./Mgr. PC Resources
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Programmers, Software Developers
60. Sys. Integrators/VARs/Consulting Mgt.

OTHER COMPANY MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
51. Sales & Mktg. Management

OTHER PROFESSIONALS
70. Medical, Legal, Accounting Mgt.
80. Educator, Journalists, Librarians, Students
90. Others _____
(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant

A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Local Area Networks
F. No Computer Involvement

Address Shown. ☐ Home ☐ Business

Basic Rate: $48 per year. *U.S. Only

COMPUTERWORLD

E2042-X

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

Paper age ends as supplier picks Pick

ON SITE

BY GARY H. ANTHES
CW STAFF

NEWPORT NEWS, Va. — Ferguson Enterprises, Inc., the largest distributor of plumbing and heating supplies in the U.S., has in six short years propelled its information processing technology from the 19th century directly toward the 21st.

The $600 million company is completing a cutover to the largest Sequoia Systems, Inc. installation and the largest Pick operating system environment in the world as part of a $5.8 million fault-tolerant system supporting 2,000 users in 19 states.

In 1984, the $200 million firm had no computer systems and was proud of it, said Thomas M. Ward Jr., manager of information systems: "We were probably the largest nonautomated firm in the U.S. Our manual systems were second to none. They even told you where to put a staple on a document."

However, getting the staple in the right place could only carry the company so far, and success of the manual systems required meticulous training that became increasingly difficult to provide in the rapidly growing company, Ward said. Ferguson began sending its inventory management work to a computer service bureau.

Take it in-house

That first step away from paper proved short-lived. Almost immediately, Ferguson realized that its customer service goals were incompatible with the slow turnaround offered by the service bureau's batch processing. An in-house system, resisted for so long, seemed the only answer.

Late in 1984, Ferguson turned to Wilton, Conn.-based Ultimate Data Systems, buying the source code to Supply House Information System (Shims), a package that included order entry, inventory management, purchasing, billing and accounting. Ferguson also bought 12 Honeywell minicomputers running the Pick operating system, for which Shims was written.

The plumbing supply wholesaler spent the next four years setting up six regional data centers supporting 176 sites in the South and Midwest.

"We thought that would be the end, that we'd stop there," Ward said. But the company wanted to be able to do inter-regional inquiries so that parts not in stock in one area could be quickly provided from another.

Also, Ward's staff was spending an inordinate amount of time supporting the multiple-machine environment and the duplicate software, and the minis were running out of steam as the 120 users per machine originally forecast mushroomed to more than 300.

Ward *overcame resistance to automation*

In 1989, Ferguson began looking for a centralized system. The company considered systems from Hewlett-Packard Co., Prime Computer, Inc., Encore Computer Corp. and Sequoia. According to Ward, only Sequoia had his "dream of dreams" — a single machine with high availability running native Pick.

Ward acknowledged that the relative obscurity of Sequoia made Ferguson's management nervous, but a recent agreement by HP to market Sequoia computers gave Sequoia credibility. Ward said he was also impressed by the results of benchmarks, crafted by Ferguson, that showed better than linear improvements in performance as more processors were added to a Sequoia box.

Ferguson is shutting down its regional centers at the rate of one a month now, and Ward expects to have completed the conversion by December. So far, no serious problems have been encountered, he said.

According to Ward, Ferguson greatly underestimated the changes that had to be made to the off-the-shelf software package it bought to run its business, and the Basic programs were completely rewritten by Ferguson. But Pick, whose use was originally mandated by the choice of the package, proved a blessing in disguise, he said.

"I'm in love with it. I'm convinced that one of the reasons our efforts have been so successful is because of Pick," Ward said. "One of the reasons we're at the forefront of our industry is because of our ability to bring out applications quickly. I've never seen an application environment as rich or as easy to use."

But Pick has its drawbacks, Ward acknowledged: "It's a very nonstandard operating system. If you want to talk to the outside world, you pay a penalty. And it's harder to find Pick-trained people, although Pick is not hard to learn."

Ferguson's Sequoia Series 300 Model 364 has 16 Motorola, Inc. 68030 processors, 256M bytes of memory — shadowed by another 256M — and 17.3G of mirrored disks. Ward said Ferguson may eventually do a field upgrade to 68040 processors, boosting capacity to support 4,000 users, which Ferguson could have in about five years.

Shipper taps Unix for transaction processing

BY ELLIS BOOKER
CW STAFF

AKRON, Ohio — The number of firms migrating to Unix for their on-line transaction processing (OLTP) needs increased by one this month with the addition of the Roberts Express shipping company.

By next June, Roberts hopes to have moved a Cobol application for tracking its truck fleet from two Wang Laboratories, Inc. hosts to a multiprocessor Sequent Computer Systems, Inc. computer running Ingres Corp.'s fourth-generation OLTP database.

Roberts' MIS manager, Joe Greulich, acknowledged that he found the open systems solution a hard sell at first.

"If you said 'Unix' to me, I'd say 'university,' " said Greulich, who joined the specialty carrier 1½ years ago.

However, Greulich is now a true believer, convinced that Unix and a relational database will be up to the job. He had better be. The MIS manager revealed that 30% of his pay is tied to response time and availability of the company's information systems.

A subsidiary of Roadway Services, Inc. in Akron, Roberts had revenue of more than $75 million last year. A Wang shop since 1983, it now has two of Wang's biggest platforms — a VS 10000 and a VS 7310 — which together support about 200 users at any given time. The hosts also support all of Roberts' back-office business functions.

Greulich *made open systems switch*

Customer service and operations agents connected to the two VS minicomputers handle more than 100,000 inbound telephone calls per month. The application today runs at approximately 25 to 30 transaction/sec. and is growing.

The OLTP application involves tracking Roberts' fleet of about 1,200 trucks, each of which is equipped with two-way mobile satellite terminals. Every hour, the units report back to the home office in Akron on each vehicle's location, accurate to within 300 yards.

A development system using a two-processor Sequent S81 is currently installed, and another 10-processor, 50 million instruction per second S81 machine will be arriving in the spring to be utilized as the production host.

Chicago-based Ameritech Information Systems, Inc. is acting as the systems integrator for the project. A spokesman at the Ameritech subsidiary said the 18-month contract is by far the most significant OLTP engagement it has ever been involved in.

Although Wang told Greulich that its high-end machines would not directly run Unix, the company has proposed using Roberts' decommissioned hosts to run an imaging system that will be tied to the OLTP application, according to Greulich.

"We're interested in that, and we're looking," Greulich said, adding that he has been very pleased with Wang's service and support.

"Users who need connectivity software for remote access...should investigate MUST Software's NOMAD."—Richard Finkelstein, DBMS, 11/89

Planning for connectivity in the '90s?

A far-reaching plan needs a far-reaching leader. Look to NOMAD, the most powerful tool for multi-platform application development, to help you get connected.

From NOMAD on your PC you can reach out to SQL databases on many platforms—like Microsoft SQL Server and Gupta's SQLBase on a LAN, Rdb on DEC VAX and DB2 on the mainframe. And with NOMAD's rich language and CUA toolkit, you won't have to sacrifice application development power to get the connectivity you need.

NOMAD power. To find out why more than 300,000 users have chosen NOMAD to lead them into the future, call **1-800-441-MUST.**

NOMAD POWER

MUST SOFTWARE INTERNATIONAL

NOMAD is a registered trademark of U3S International Ltd. Microsoft SQL Server is a trademark of Microsoft Corporation. Other product names are trademarks of their respective holders.

CDC

FROM PAGE 29

Cyber 930 and a Cyber 830. However, the company is hedging its bets and has also purchased a Digital Equipment Corp. VAX. Acedo is concerned about the lack of third-party applications available for Cyber mainframes. "The reason we bought the DEC VAX," Acedo says, "is because more applications are available for it than for the CDC processors."

Whether CDC will emerge victorious in its chosen market niches is still in question. Analysts claim that the proprietary NOS/VE operating environment for the Cyber mainframe series is more than 10 years old and has not been enhanced to keep up with competitive advances, such as mainframe partitioning, hyperspace and IBM's AD/Cycle.

Taking into account this lack of a major overhaul of NOS in a decade, "combined with the company's newfound Unix commitment, I don't think they will be in the proprietary mainframe business for the long haul," says Frederick Withington, an independent consultant in New York.

Ousley disagrees, claiming that CDC will continue to upgrade the Cyber systems' proprietary software to protect its customers' investment in software applications. He underscores the company's dedication to maintaining NOS/VE by citing the $365 million, 11-year contract it won with the Army Corps of Engineers for up to 98 Cybers. CDC was awarded the contract over the likes of Electronic Data Systems Corp, the company says.

As of July 1990, eight Army Corps sites have been pilot-tested using the Cyber systems in a networked environment. The systems will be used for a mix of database management, office automation and engineering/scientific applications, according to Ken Calabrese, program administrator within the Army's information systems department handling the Corps of Engineers.

Over the long haul

However, such moves haven't alleviated customer concerns. With the lack of third-party software development, "we are definitely worried about CDC's long-term commitment to its proprietary Cyber systems," says Walter McRae, interim director of university computing and network services at the University of Georgia's Advanced Computational Methods Center in Athens, Ga.

The university currently has one Cyber 960 mainframe and a Cyber vector facility tool for high-performance vector processing. However, both systems have become obsolete for the university's needs.

The university is looking into Unix in the form of a CDC/Mips system as a future platform for its computer services. "The ability to continue to run Cyber's NOS environment and the value-added services, including data center management and communications facilities, that CDC claims it will incorporate into its Unix-based system make them attractive to us," McRae says.

However, he adds, "We have not ruled out looking at other vendors' products."

Ousley says he wants to stem any such thoughts of jumping ship by guaranteeing that the transition from NOS to Unix will be as painless as possible. "We will probably offer a compatibility box and other options to help customers continue to benefit from their current NOS/VE investment," he says.

Until the new systems are ready for delivery, however, all CDC can do is keep trying to win back users' confidence and gain market share. Some of the big wins that CDC has claimed so far include a $32 million sale to the Soviet Union following Soviet President Mikhail Gorbachev's visit to corporate headquarters last summer. The Soviet Union will purchase a variety of equipment and services, including six Cyber 960 mainframes, in order to improve nuclear plant safety within the country.

Gorbachev's visit has since been followed by a visit from Alexander Dubcek, chairman of the Federal Assembly of Czechoslovakia. While no contract has yet been signed, Ousley says he hopes to sell Unix-based workstations for computer-aided design applications in that country.

Thailand's Ministry of the Interior is also planning to stick with CDC systems. A Cyber mainframe is being used to keep track of the population of Thailand. According to Surachai Srisaracam, director of the Central Population Database Center for Thailand's Ministry of the Interior, the system is used to process passports and maintain photo information and monthly statistics on population as well as systems for tax collection, social security, military manpower and criminal investigations.

CDC sees the ever-growing global marketplace as one of its greatest market opportunities. Rather than competing against IBM head on, CDC says it will continue to go after sales in its target markets in the U.S. and pursue more sales in the Soviet Union and other overseas markets opened to foreign trade.

Ousley maintains that CDC has an edge in sales to the Eastern Bloc because of its successful sales efforts there so far.

Depompa is a free-lance writer based in Upper Marlboro, Md.

Revenue shrunk — and so did CDC

CDC pruned at least 12 subsidiaries in the '80s, including ETA Systems, its supercomputer business, and Imprimis, a disk drive operation sold to Seagate Technologies, Inc. The majority of CDC's consolidation occurred between 1986 and 1990, shrinking the company's total revenue from about $3.7 billion in 1985 to an expected $2 billion in 1990.

Ironically, despite greatly reduced revenue, 1990 may be the first year that the slimmed-down CDC achieves a significant profitability level since 1983, when it reported $161.7 million in profits. Analysts currently estimate that CDC is likely to report between $40 million and $60 million in profits for 1990.

Even the Computer Products Group (CPG), the single largest unit of CDC today, has been revamped. According to Jim Ousley, the unit's president, CDC has consolidated CPG to better focus that division's attention on its target markets: primarily scientific and engineering applications and users with large technically-oriented databases — what Ousley refers to as "technical information management."

BARBARA DEPOMPA

Sputtering earnings

CDC has had two profitable years – '87 and '88 – in the last five

CONTROL DATA

	Revenue (in millions)	Net earnings (in millions)
1985	$3,680	($568)*
1986	$3,347	($265)
1987	$3,367	$19.3
1988	$3,628	$1.7
1989	$2,935	($680)

*Parentheses indicate a loss

Source: Control Data Corp. CW Chart: Paul Mock

Amdahl whips latest release into Unix shape

BY JEAN S. BOZMAN
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp. has brought UTS, its mainframe version of Unix, in line with prevailing Unix industry standards, industry analysts said. Release 2.1, announced in September, is compliant with Unix System V Version 3.1, and Release 2.0 will be phased out by October 1991, Amdahl said.

Analysts said they believe the change was prompted, in part, by a burgeoning market for Unix products in Europe and in the U.S. government. "The demand for mainframe Unix is coming from behind the [computer room's] glass wall," said Rikki Kirzner, senior analyst at Dataquest, Inc. in San Jose, Calif.

Acting as a corporate anchor for Unix applications, UTS will continue to run on IBM-compatible MVS and VM machines.

Using IBM's PR/SM or the older Amdahl Multiple Domain Facility (MDF), UTS sites can divide their IBM mainframe memory into multiple IBM-compatible or UTS/Unix-compatible regions. Worldwide, some 200 licenses have been sold in UTS' 10-year history, but Amdahl hopes to gain new sites with UTS Release 2.1, analysts said.

Major enhancements in UTS 2.1 include an increase in file size from 2G bytes to 6 terabytes, improved security features and an ability to share data with IBM's MVS and VM operating systems. "We've built a channel-to-channel connection to [IBM's] [Systems Network Architecture]," said Tom Littauer, manager of UTS product marketing. Sequential I/O rates have been boosted from a sustained rate of 300K byte/sec. to 1.7M byte/sec., Littauer said. Monthly license fees for UTS 2.1 range from $4,000 to $25,000, depending on the size of the mainframe that runs the software.

At the same time, Amdahl announced two new front-end processors, the 4655 Models 100 and 200, priced from $85,000 to $384,000, depending on configuration. The new processors are designed to collect data from Unix and X.25 networks for presentation to the mainframe UTS facility. As Robert Kidd, an analyst at Dataquest, explained, "The main point here is that the more homogeneous your network is from the start, the easier it will be to manage."

Apollo users push open Unix

BY J. A. SAVAGE
CW STAFF

SAN DIEGO — The biggest concern for users of Hewlett-Packard Co.'s Apollo workstation line is over the future of its Unix operating system, Domain OS, according to users who attended the Adus Apollo user group conference recently.

Since the merger of Apollo and HP in April 1989, users have been waiting and watching to see what will happen with HP's promise to merge its own version of Unix with Domain. Users lobbied Apollo to take Domain past HP's own HP-UX version of Unix and into the Open Software Foundation (OSF) standard, across the product line.

Before the conference, HP had said it would migrate Domain to OSF, but not across its entire workstation line. After hearing from its users, the company still would not commit to providing a new Unix-OSF kernel for all its computers.

"We don't have unlimited money to do all the options that [users] want," said Bill Kelly, manager of software marketing for Apollo. He said the company would add a layer of software on top of the old operating system instead of replacing it to bring it more closely toward open Unix.

HP representatives told the group that the company is attempting to put Domain OS functionality in its OSF version of Unix so that "Domain users will go there naturally," said Doug Eltoft, president of Adus.

However, they will have to cut over to OSF in the next few years, according to David Galbincea, senior consultant at Genicos Technologies in Medina, Ohio. "The next versions of Domain will incorporate the best of OSF as far as file systems," he said. In the mid-1990s, however, users will have to consider switching out of Domain to OSF, Galbincea said.

Apollo users were accustomed to "being taken care of" before Apollo was bought by HP in April 1989, Eltoft said.

At the conference, users were still grappling with the change. Eltoft added that there is a fine line for HP — either catering to its customers or competing in the marketplace.

"IBM plans obsolescence. Sun arbitrarily drops lines. Apollo users are used to running code between the oldest machines and the newest," he said. "They're deluding themselves about the real world; it's very cutthroat."

Computer networking that's simpler than ever.

OS/2 can do!

Seamless connectivity. Every business wants it. And every business will experience the limitations of trying to achieve it with DOS. But OS/2® Extended Edition (EE) was designed for connectivity and provides the flexibility you need today and tomorrow.

Now, you may only want to share a laser printer on a LAN configured with Token-Ring or PC Network. With OS/2 and OS/2 LAN Server, it's simple. Later, when you need to do more, like access a host or an Ethernet® network, you can, since OS/2 EE has these functions built in. And by adding IBM TCP/IP software, you can even access multivendor networks from your computer.

But best of all, when you combine OS/2 EE with IBM's Micro Channel™ and its interrupt-handling capability, you can run several communications sessions at once—without sacrificing reliability, even during peakload conditions.

Want to simplify your computer networking? With OS/2 Extended Edition, the solution is IBM.

Find out more about OS/2. Contact your IBM Authorized Dealer or marketing representative. For a dealer near you, call 1 800 IBM-2468, ext. 197.

IBM

IBM and OS/2 are registered trademarks and Micro Channel is a trademark of International Business Machines Corporation. Ethernet is a registered trademark of XEROX Corp. © 1990 IBM Corp.

Johnson

FROM PAGE 29

total to 15 worldwide.

In addition, IBM's Worldwide Opportunity Council, a group of executives who scope out what customers are clamoring for, recently tagged GIS as one of the Top 20 applications to pursue in the '90s.

"I believe GIS is going to be a utility like word processing or spreadsheets," said Alison Libshitz, a manager at IBM's GIS Solutions Center in Houston.

An insurance firm might use a GIS to coordinate policyholder addresses with floodplain data, ensuring that flyers for flood insurance get to the right households. Hotels and department stores could use GIS information to pinpoint the most profitable locations for new branches

IBM's WORLDWIDE Opportunity Council . . . recently tagged GIS as one of the Top 20 applications to pursue in the '90s.

or to sharpen an advertising campaign.

"Call Before You Dig" systems from telephone companies often rely on a GIS to keep track of their cabling. Federal Express also uses a GIS to determine the best delivery routes.

Many major corporations are already converts, Montgomery noted. "Virtually every one of the Fortune 500 has a major project under way in GIS," said Montgomery, who is also president of Utility Graphics Consultants, the largest GIS consulting firm. "A lot of these projects start out in the engineering department, with MIS asked to assist, not to direct or lead."

The majority of Utility Graphics' clients consider their GIS databases as enterprisewide concerns, he added.

GIS enthusiasts like to compare the relative obscurity of their field today with the status held a decade ago by computer-aided design and engineering systems.

When industry analysts talk about the growth of the GIS business, they tend to burble a bit, using words like "explosive," "robust" and "phenomenal."

Worldwide sales of hardware, software and services from GIS vendors topped $612 million in 1989, growing a healthy 16% over the previous year, according to Daratech, a market research firm in Cambridge, Mass. Counting only software, GIS sales worldwide expanded by 45% from 1988 to 1989, hitting $223 million in revenue last year.

The first wave of GIS interest happened far from corporate boardrooms in local governments, utilities and state natural resource departments — Smokey Bear stuff, such as forest management.

Then came the interest from the military and intelligence communities, the airlines and transporation companies as well as the mapmakers such as Rand McNally. Today, there are at least 120 hardware and software vendors servicing GIS, and another 350 data conversion companies turning paper files into digitized data.

The growth of GIS stems from several factors. Graphics workstations got better, more powerful and cheaper. Commercial and government-made databases of digitized geographic information became more accessible. Scanning technologies improved. Cities, counties and states began sharing their databases rather than reinventing a very expensive wheel.

The future holds some distinctly MIS-like challenges for GIS, however.

For one thing, there is a burgeoning need for standards. For another, the use of computer technology in capturing the data far exceeds traditional methods of managing it (sound familiar?), and businesses will want to incorporate other types of imagery — scanned drawings, photos or documents — into those geographical databases.

Johnson is a *Computerworld* senior editor, systems and software.

TI sets its CASE sights on broad target

BY MARYFRAN JOHNSON
CW STAFF

Aiming beyond the Big Blue horizon, Texas Instruments, Inc. will move its premier computer-aided software engineering (CASE) tools outside the IBM mainframe environment and into multivendor corporate information systems shops.

Earlier this month, TI announced marketing and development agreements with Digital Equipment Corp. and Tandem Computers, Inc. that will bear fruit gradually, as TI's Information Engineering Facility (IEF) CASE tools are ported first to its own TI1500 Unix, DEC's VAX/VMS and Fujitsu's Unix.

The initial products are scheduled to be available in March 1991, and TI will announce prices in January.

"The idea is to develop an application using IEF on one platform and then send it to the target platform," said Mike Watters, vice-president of TI's advanced information management division.

The alliance with Tandem will eventually allow users to develop and run on-line transaction processing applications independent of a specific computer or operating system, said James Treybig, president of Tandem.

The IEF products for Tandem computers will roll out more slowly, however. The first phase, in late 1991, will require IBM's OS/2 and MVS operating systems. By 1992, users will be able to develop on OS/2 and Tandem Nonstop systems independent of MVS.

"It's not that TI is shifting focus. They're broadening focus," said John Dunkle, an analyst at Workgroup Technologies in Hampton, N.H. "They're clearly moving more into the midrange in recognition of the fact that as people move to distributed environments, the midrange becomes pivotal for applications development."

Lubrizol Corp. in Wickliffe, Ohio, has been a beta-test site for IEF running under VAX/VMS. The CASE tools were used to generate code on an OS/2 workstation, and the application now runs under both IBM MVS and VAX/VMS.

"The value of the product to us is its full life-cycle integration," said Georgio Sorani, MIS director at the chemical manufacturer. "We can take it from design to construction, and the integration really pays off."

Sorani said the applications under development at Lubrizol — in-house research systems — have been superior in quality to what IS could accomplish with a mixed bag of CASE tools or traditional third-generation languages.

"There were three things important to us: platform independence, fully integrated tools and the ability to do as much development as possible on intelligent workstations," Sorani said.

While TI has announced support for IBM's Systems Application Architecture strategy and AD/Cycle repository for CASE tools, analysts said this alliance with DEC and Tandem may enable all three companies to effectively compete with AD/Cycle.

"Users should be cautious in that TI will be marketing quite heavily before the products are actually available — like every company in this industry does," said Frank Michnoff, a research analyst at Meta Group, Inc. in Westport, Conn. "But while cross-platform technology like this is still quite immature, a lot of companies are beginning to examine it."

"WHILE cross-platform technology like this is still quite immature, a lot of companies are beginning to examine it."

FRANK MICHNOFF
META GROUP, INC.

Now That D&B Software Offers Two Competitive, Financial Products Where Does That Leave You?

Uncertainty is the last thing you want to feel about the financial software your company depends on.

Which is why more and more, both McCormack & Dodge and MSA clients are considering Masterpiece.®

Masterpiece is a totally integrated, comprehensive financial software solution from Computer Associates.

For MVS, VSE, AS/400, s3x, and VAX, Masterpiece offers superior technology and unsurpassed flexibility.

It also comes with considerable peace of mind.

Masterpiece is supported enthusiastically and unequivocally by the world's leading independent software company, Computer Associates.

Dial 1-800-645-3003 to find out more about the financial software that's behind America's most successful companies.

Call today, before somebody breaks your heart.

CA90s
CA's Computing Architecture For The 90s protects and enhances the value of every CA software solution.

COMPUTER ASSOCIATES
Software superior by design.

© 1990 Computer Associates, Inc., 711 Stewart Avenue, Garden City, NY 11530-4787. All trade names referenced are the trademarks or registered trademarks of the respective manufacturer.

A Comparison Chart of the Major Cooperative Processing Software Products:

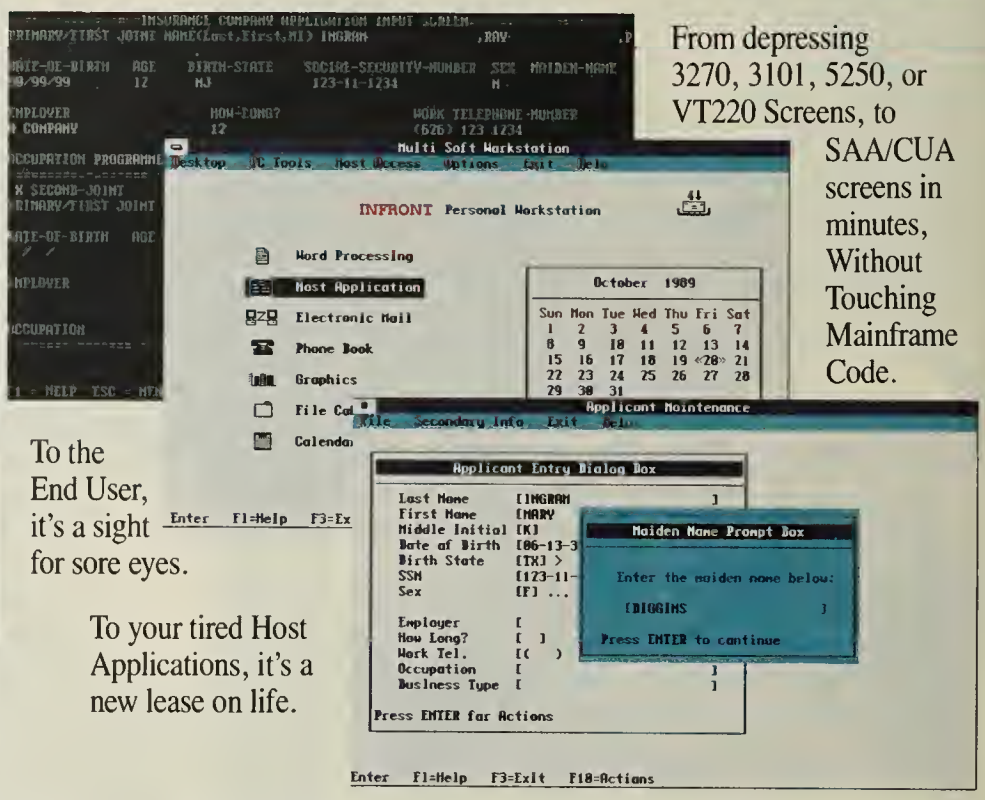
FUNCTIONS:	SUPER-LINK®	Easel™	Mozart™	Arbiter®	IBM's HLLAPI™	IBM'S APPC™
Processing Topologies Supported						
Peer-to-Peer Processing	✓			✓		✓
Existing terminal-based systems	✓	✓	✓		✓	
Mixed Peer-to-Peer and existing systems	✓					
Application integrity/Software Distribution	✓		some			
SAA/CUA Interface compatibility	✓	✓	some			
Workstation Environments Supported						
PC/DOS	✓	✓	✓	✓	✓	✓
OS/2	✓	✓	✓	✓	✓	✓
PC/DOS to OS/2 application compatibility	✓		?			
LAN Server for shared applications and data	✓		?			
Multiple transaction servers on a LAN	✓					
Development Environment Comparison						
Object orientation	✓	some				
Dictionary and documentation	✓					
Panel/Form painter for creation/maintenance	✓	✓	some			
3270 screen capture: picture and attributes	✓					
CASE/Application Generation	✓	✓				
Intelligent (language-sensitive) editor	✓					
System and user-defined reusable code templates	✓					
Integrated compile/test/debug	✓	✓				
Execution time source debugging	✓	some				
All development tools for DOS available in DOS	✓		✓			
Objects Supported						
CUA display images	✓	✓				
CUA dialog within display object	✓					
Validation within display object	✓					
Help processing	✓					
Error processing	✓					
Text window interactions	✓	some				
Business graphics	✓	✓				
3270 definition	✓					
Interactions with 3270	✓					
Interactions with Peer-to-Peer	✓					
"Logon" Scripts	✓					
Application integrity/Software Distribution	✓					
Local Data Access						
Indexed files	✓		✓			
dBase	✓		✓			
Flat Files (random access)	✓					
Flat Files (sequential access)	✓	✓	✓			
Multiple read/write to files on LAN Servers	✓					
High Level Functions Directly Available in the Language						
Field-level context sensitive help	✓		✓			
Optional user learning mode	✓					
Display and selection from:						
Indexed files	✓		✓			
Sequential files	✓	✓	✓			
In-memory lists	✓	✓	✓			
Menu display and selection	✓		✓			
Determining 3270 screen identification	✓		✓			
Read/write to 3270 in a single command	✓					
Read/write to 3270 one field at a time	✓	✓	✓			
Determine dynamic 3270 attribute changes	✓					
Embedded user assistance (pop-up selection lists)	✓					
Data editing/validation:						
Data type/mark checking	✓		✓			
Single range/limit check	✓		✓			
Field/data driven range/limit check	✓					
Date formatting/validation	✓		✓			
Validation against local and LAN files	✓					
Required fields	✓		✓			
"Must Fill" fields	✓					
Zero not valid fields	✓		✓			
Peer to Peer Host Environments Supported						
MVS-CICS	✓			✓		✓
MVS-IDMS/DC	✓					
MVS/TSO	✓					
DOS/VSE-CICS	✓			✓		
VM/CMS	✓			✓		✓
DEC VAX/VMS	✓					
Software Distribution Host Environments Supported						
MVS-CICS	✓		✓			
MVS-IDMS/DC	✓					
MVS/TSO	✓					
DOS/VSE-CICS	✓					
VM/CMS	✓					
DEC VAX/VMS	✓					

Every effort to present an accurate chart has been made, however no guarantee can be made (1/2/90). Super-Link® is a registered trademark of Multi Soft, Inc., Lawrenceville, NJ. Mozart™ is a trademark of Aspen Research. Easel™ is a trademark of Interactive Images, Inc. Arbiter® is a registered trademark of Tangram Systems.

Don't be Suckered, Pushed, or Intimidated into expensive OS/2 hardware just to get SAA/CUA.

Multi Soft delivers SAA/CUA on character based 640K DOS PCs.

Save over $5000 per station, extend the life of your corporate hardware and software assets, and save millions of dollars!



From depressing 3270, 3101, 5250, or VT220 Screens, to SAA/CUA screens in minutes, Without Touching Mainframe Code.

To the End User, it's a sight for sore eyes.

To your tired Host Applications, it's a new lease on life.

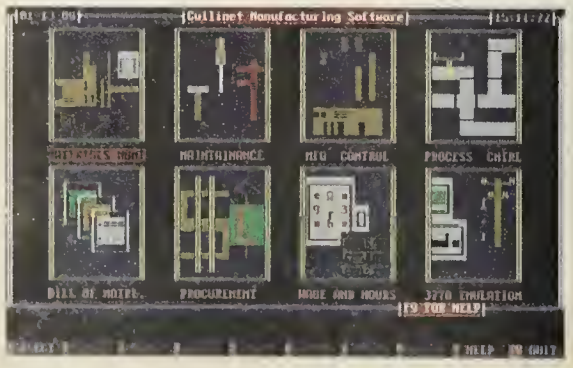
Multi Soft's INFRONT/DS™ & EasySAA™ products enable rapid development of intelligent SAA/CUA cooperative processing applications on standard low-cost 640K DOS PCs.

In addition its INFRONT/SDF™ (Software Distribution Facility) maintains the integrity of your software applications, tables and data.

And its INFRONT/HPO™ product provides the full peer-to-peer cooperative processing capabilities of IBM's APPC (Advanced Program-to-Program Communications) product for PC/host applications. However, instead of requiring the use of LU6.2 SNA sessions, it works over the LU2-based networks that are already in place. Both standard, LU2-based SNA links, as well as asynchronous communications are supported.

The SUPER-LINK® product family represents the leading edge, and by far, the only complete family of cooperative processing products.

Not even IBM offers that kind of support now. In addition all SUPER-LINK based applications port without change to IBM's OS/2, PM, and LU6.2 strategic platforms.



You can even add ICON Based Menus & Backgrounds on your CGA character based DOS PC *in minutes!*

The Experts in Cooperative Processing

Multi Soft, Inc.

123 Franklin Corner Rd.
Lawrenceville, NJ 08648
800-888-4973
609-896-4100
Fax# 609-895-0072

14,000+ USERS WORLD WIDE

NEW PRODUCTS — SOFTWARE

System software

Braintree Technology, Inc. has announced Version 1.8 of Auditor, a Digital Equipment Corp. VAX/VMS security investigator and auditing software package.

The product enables system managers to identify and correct security breaches in VMS systems. It can be used to review system authorization files and report on accounts that have gone unused for days, the vendor said.

Auditor Version 1.8 requires VMS Version 5 or higher and is available for free to current Auditor users. First CPU licenses range from $500 to $15,000, depending on CPU size.

Braintree Technology
600 Cordwainer Drive
Norwell, Mass. 02061
(617) 982-0200

Rocket Software, Inc. has announced the latest version of its resource monitor and administration facility, designed for IBM's Query Management Facility operating with IBM's DB2 database management system.

Rocket/QMF Version 1.1 can actively monitor QMF sessions and control resource usage according to parameters established by systems administrators. It also includes a scheduling facility that enables administrators to define specific resource limits for using QMF during peak and off-peak hours, the vendor said.

Pricing ranges from $8,700 to $13,600, depending on CPU size.

Rocket Software
161 Worcester Road
Framingham, Mass. 01701
(508) 875-4321

Database management systems

Programart has released Strobe DB2 Feature, an IBM DB2 application product designed to be used during all phases of an application's life cycle.

The product provides a full picture of a DB2 application's resource in an address space and identifies the Data Base Request modules and SQL statements that cause CPU consumption in DB2 service routines.

Pricing begins at $16,900. Current Strobe users can obtain the new release free.

Programart
1280 Massachusetts Ave.
Cambridge, Mass. 02138
(617) 661-3020

Cognos Corp. has announced that its Powerhouse Starbase relational database management system is now available for users of Hewlett-Packard Co.'s HP MPE/XL systems.

Starbase, part of the Cognos Powerhouse application development environment, provides a second-generation RDBMS for users of HP MPE/XL systems. It allows applictions developed for HP MPE/XL to operate immediately by sharing and accessing data in HP Turbo Image, KSAM or HP MPE files.

Pricing ranges from $15,000 to $100,000, depending on configuration.

Cognos
67 S. Bedford St.
Burlington, Mass. 01803
(800) 426-4667

Languages

Must Software International, a division of U3S International Ltd., has announced that its Nomad relational fourth-generation language is available for IBM's Enterprise System/9000 family of processors.

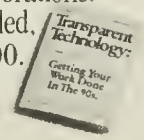
The product can be used with IBM's DB2 relational database for application development and reporting tasks. Its cooperative processing features allow users to split application functions among IBM mainframes, Digital Equipment Corp. VAX machines and IBM Personal Computers, the vendor said.

Pricing ranges from $10,000 to $235,000, depending on CPU size.

Must Software International
4th Floor, 101 Merritt 7
Norwalk, Conn. 06856
(203) 845-5000

After Trying Our Business Software, American Tourister® Sent The Others Packing.

It was an open and shut case. Only our *Financial, Human Resources* and *Environmental Management* software for the IBM AS/400 provides you with the mainframe functionality and PC ease-of-use necessary to let you get more work done.
That's why our midrange solutions are being chosen by more and more Fortune 1000 corporations.
Free White Paper Offer: For more information and a free copy of a white paper entitled, "Transparent Technology: Getting *Your* Work Done In The 90s," call 1-800-388-2000.



Software 2000
The Difference Is Expertise.

ATLANTA • BOSTON • CHICAGO • LOS ANGELES • LIMERICK • LONDON

1800 Series Concept Collection from American Tourister IBM and AS/400 are registered trademarks of International Business Machines Corporation.

Reason #1: Full Line.
286. 386SX. 386. 486.
Desktop and desk-side models.

Reason #2:
Full Compatibility.
For hardware, software and networking.
To meet your needs today and tomorrow.

Reason #3: Networking.
PCs from a world leader in multivendor networking.

Reason #4: Reliability.
HP quality means low cost of ownership.

Reason #5:
Service & Support.
Extensive dealer network backed by HP's award-winning service and support.

A free HP LaserJet is the last reason to buy HP PCs.

Reason #6: Free Printers.
For a limited time only, our PCs come with priceless bonuses: free HP LaserJet IIP, III, IIID and DeskJet 500 printers. Contact your participating HP dealer for full details. Call **1-800-752-0900, Ext. 1562** for the dealer nearest you.

There is a better way.

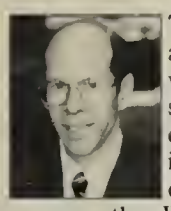
© 1990 Hewlett-Packard Company CPPC005
Offer good with purchase of HP Vectra 286, 386SX, 386 and 486-based PCs. As few as two PCs qualify buyer for free printer. Purchase of video monitor not required. All PCs must be purchased at the same time from an authorized HP dealer.
Offer ends December 31, 1990.

HEWLETT PACKARD

COMMENTARY

Efrem G. Mallach

OS/2's gap? Salesmanship



The standard arguments for why OS/2 isn't selling usually focus on product issues. Maybe it doesn't offer any more than Windows 3.0. Maybe it's as complicated as Unix without the maturity. Maybe it's a poor copy of today's, or tomorrow's, Apple Macintosh.

Perhaps the real reason is how the product is sold. We can learn something about selling products from the acknowledged masters of the art — the automobile folks.

When Honda entered the U.S. luxury car market, it didn't let existing Honda dealers sell the new cars. Instead, it set up a totally separate network of Acura dealerships. Auto industry gurus predicted disaster. Today, Honda's move is recognized by many in the auto industry as a stroke of genius.

Separate distribution channels are necessary, as Honda recognized, because the selling process differs for different kinds of cars. The products may differ, but the way people buy them — and, consequently, the way the selling process must work — are quite different.

Today's desktop computer market suffers from the same myopia that auto experts once

Continued on page 52

Mainframe treatment for PCs

ANALYSIS

BY RICHARD PASTORE
CW STAFF

The trend to connect personal computer-based networks to mainframe-style peripherals has extended to centralized laser printers. Recent announcements from Eastman Kodak Co. and Xerox Corp. will give users of $2,000 PCs direct access to $250,000 printers. But while those high-speed machines seem ideal for megavolume jobs, some analysts say they may be overkill for the typical PC network.

Announced last month and available now, the $250,000 Adobe Systems, Inc. Postscript-compatible Kodak Lionheart system prints at 10 times the rate of the average desktop laser machine. It also offers finishing capabilities such as stapling and two-sided printing.

The system's intended host platforms are IBM, Apple Computer, Inc., Digital Equipment Corp. and Sun Microsystems, Inc. workstations linked by Ethernet, IBM's Token-Ring or Apple's Appletalk.

Kodak said it hopes to fill a need for centralized printing and act as a complement to distributed desktop printers. While smaller printers will take care of short jobs or "proof" copies, Lionheart will best handle multiple copies of lengthy and high-volume documents, a spokesman said.

King of the desktop

Hewlett-Packard's Laserjet III, one of the most popular desktop laser printers, is a pussycat compared with Kodak's Lionheart

	Laserjet III	Lionheart
Print speed	8 page/min.	92 page/min.
Memory	1M byte	18M bytes
Number of bit-mapped fonts	14	200
Price	$2,395	$250,000

CW Chart: Marie Haines

Earlier this month, Kodak's copier competitor, Xerox, announced the first in its own new series of printers, the Docutech Publishing Series [CW, Oct. 8]. Xerox said it plans for the $220,000, 136 page/min. printer to connect directly to networks by next year.

PC networks are increasingly connecting directly to centralized peripherals, such as system storage units, which were once exclusive to mainframes and minicomputers. Benefits include a tighter link between end user's software and the peripheral.

An intervening mainframe renders the PC software-to-central printer connection "tenuous at best," said Brandon Nordin, an analyst at BIS CAP International, Inc. With a direct connection, users will reap all the feature advantages of their soft-

Continued on page 53

Laptops make big splash in Japan

BY MICHAEL FITZGERALD
CW STAFF

The day of the desktop computer may be coming to an end, at least in Japan.

Japanese factories shipped more laptop computers than they did desktop personal computers between April and June, according to a report from the Japan Electronic Industry Development Association (JEIDA). Portables, which made up 51% of the market during the period, have never before outshipped desktop production in Japan.

A slight disclaimer, though: The figures included machines made for export. While JEIDA's figures showed that Japanese computer factories shipped 327,000 laptops, compared with 317,000 desktop machines, desktops outshipped portables in Japan itself by a margin of 268,000 to 216,000. Laptops thus held some 44% of the Japanese market.

Observers say that the fast-paced development of better, lighter portables as well as cultural concerns, such as desks that are two-thirds the size of American desks, make laptops a natural for both Japanese corporations and consumers.

Space is so tight in some Japanese corporations that workers joke that PCs should be called walkstations, not workstations, said Jack Plimpton, president of Japan Entry, a Boxford, Mass., firm that helps U.S. high-tech firms enter Japanese markets. Plimpton said that in many firms, PCs sit in a segregated area of the office, along with copiers and other large machines, rather than on employees' cramped desks.

Laptops also work well in the home market. Plimpton pointed out that portable word processors outsell laptops in Japan and said that he thinks that laptops and notebooks will begin to take a significant share of that market.

Pricing that is competitive with desktop machines and a kind of high-tech snobbery also contribute to higher sales, according to Bruce Stephen, an analyst at International Data Corp. in Framingham, Mass. Notebooks "are all the rage among young executives in Japan," Stephen said.

Most analysts expect that the U.S., with a PC market 10 times the size of Japan's, will continue to be a bastion of desktop sales. But even here, laptops will encroach on desktop market shares. Dataquest, Inc., a market research firm based in San Jose, Calif., projected that portables — mainly laptops and notebooks — will garner 40% of the U.S. market by 1993.

Analysts also report that U.S. portable makers have virtually no market presence in Japan and would need to significantly rework their machines to handle the Japanese language.

Micro Focus Advanced ANIMATOR

The best COBOL Debugger on any platform

See your source code in new ways and re-engineer your COBOL programs with Micro Focus Advanced ANIMATOR™.

MICRO FOCUS®
A Better Way of Programming™

- Advanced ANIMATOR is a component of the Micro Focus COBOL/2 Workbench™ used by thousands of professionals to create industrial strength business applications for mainframes and PCs.
- Choose ANIMATOR's "what you see is what you wrote" approach to testing and debugging. Watch your program execute and see every element and its value displayed automatically. Or, step through your program in a line-by-line approach.

- Query any data item and change its value. Set positionally specific conditional break-points as well as non-positional conditional break-points. Reset execution to any point in the program. Key in and execute any valid COBOL statement dynamically with ANIMATOR's DO facility. You are in total control of your test environment.
- The Structure ANIMATOR module dynamically creates structure charts of any COBOL program. And, it highlights each module as it executes. See paragraphs, sections, and other logical structures in a block diagram format. View them in split screen mode with the line-by-line ANIMATOR display in the other window.
- Analyzer™ measures and displays the number of times each line of code executes. Unexecuted code is highlighted. ANIMATOR also has a visual hacktracking facility for interactive retracing along the execution path.
- COBOL Source Information™ (CSI) is another feature within ANIMATOR. Utilizing CSI, you can locate any data items and/or procedures that were not explicitly referenced. Get a dead-data analysis and statistics showing the number of times each paragraph name is invoked, where it is invoked from, and what procedure it invokes. CSI will also show you a CALLed suh-program tree structure and a copy file structure.

For more information on Advanced ANIMATOR and the other Micro Focus COBOL tools, call us today at 1-800-872-6265 or 415-856-4161.

YOU COULD SPEND THOUSANDS OF DOLLARS TRYING TO TURN YOUR PCs INTO WORKSTATIONS.

BUT WHY?

These days, there's absolutely no limit to the things you can add to your PCs. Coprocessors. VGA cards. Large scale monitors. Network cards.

But no matter how many thousands of dollars you pour into your PCs, they still can't give you what you get with every Sun workstation. The screaming-hot performance. The multitasking. The high-resolution graphics. And the built-in networking.

And now, we're introducing a new workstation that makes all the shortcomings of your PCs even more obvious.

SPARCstation™ IPC.

At $8,995*, it's the lowest cost, full-color RISC workstation in the world. By far. In fact, it's about the same price as a high-performance 386 PC. But just look at the difference.

You get 15.8 MIPS performance. Which is almost four times faster than a 386. You get a 16-inch display with over a million pixels. That's over three times the clarity of high-resolution PCs. You get built-in Ethernet. Audio. A floating-point processor. And real 32-bit expansion slots. All standard. Plus room for 24 MB of main memory. All in a compact package that leaves lots of room on your desk.

But most importantly, like all our workstations, SPARCstation IPC is built on UNIX®. And it gives you the full benefit of distributed computing. Because, unlike PCs, it was designed to be networked from the very beginning. So you get easy connectivity to all the other computers in your company, from PCs to mainframes. As a result, people who work together actually work together.

You also get the OPEN LOOK™ user interface. With its simple icons and pull-down menus, it makes UNIX easier to use than ever before.

And since it looks like the whole world is heading our way, you get over 2,100 SPARCware™ applications to choose from—including your favorite PC programs, like Lotus® 1-2-3®, WingZ®, Oracle®, and WordPerfect®.

In fact, since this system is such a great alternative to PCs, we're making it available through our expanded value-added dealer and reseller network, as well as our current channels. For even more information on SPARCstation IPC, call 1-800-624-8999, ext. 2062.

And we'll show you a little something you'll never be able to add in to your PCs.

It's called a future.

sun microsystems

©1990 Sun Microsystems, Inc. ®Sun Microsystems and the Sun logo are registered trademarks of Sun Microsystems, Inc. SPARC is a registered trademark of SPARC International, Inc. SPARCstation and SPARCware are owned by SPARC International, Inc., and are used under license therefrom. These products are based on an architecture developed by Sun Microsystems, Inc. UNIX is a registered trademark and OPEN LOOK is a trademark of AT&T. All other products or services mentioned are identified by the trademarks or registered trademarks of their respective companies or organizations. *U.S. list price quantity 1, $8,995. Includes 16-inch, high-resolution color monitor, 8 MB of main memory, integral Ethernet, SCSI, and serial interfaces, two SBus slots, floppy disk drive, the Sun operating system and Open Windows.™ With optional 207 MB hard disk, $9,995.

SELLING TECHNOLOGY HAS TAKEN A GIANT STEP BACKWARDS.

Remember when face-to-face, eye-to-eye selling was the only way business was done?

Somewhere along the way, the costs of direct selling got out of hand. Companies came to depend on indirect channels – and products became lost in an overcrowded marketplace.

Today, companies are rediscovering the power–and cost-effectiveness–of direct selling at INFORUM, the center stage for technology sales and marketing.

☐ I'm not interested in moving my business forward. But thanks anyway.

☐ I'm ready to take the first step. Send me information.

Can't wait to hear more? Skip the indirect channels and call us toll free. The number's on the right.

MAIL TO: INFORUM, ATTN: MARKETING DEPT.
P.O. BOX 56386, ATLANTA, GA 30303.

Name

Title Company

Address

City State Zip

Phone

INFORUM

SHOW THE WORLD WHAT YOU'VE GOT.

Here in Atlanta, you can deliver your product story directly to thousands of qualified buyers, every business day of the year. Undiluted. Undistorted. And you control the sales process. Completely.

INFORUM is the perfect environment for you to forge powerful personal relationships with new customers. It's an old-fashioned idea that is making a welcome comeback.

1-800-343-5045

Cooking with expert systems

ON SITE

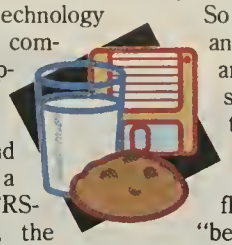
BY MICHAEL FITZGERALD
CW STAFF

PARK CITY, Utah — "Good cookie!" is what you might say after biting into one of Mrs. Fields' offerings. "Smart cookie" might also apply, because Mrs. Fields Cookies, Inc. has used information technology since the day it baked its first batch 13 years ago and has developed a reputation for excellent use of innovative software.

Although its host systems have traditionally been from IBM, Mrs. Fields is no chip-off-the-old-block user of information technology. The company relies heavily on expert systems running under both the Application System/400 platform and DOS to manage its six-country chain of 650 company-owned stores.

Mrs. Fields uses two AS/400 Model 60s linked via token-ring and in-store, stand-alone personal computers largely based on the Intel Corp. 8088 chip. The stores are linked to the host by Xcellenet Corp. communications software.

This is a far cry from the early days at Mrs. Fields, when the company installed an ancestor of the facsimile machine called a Quim in its first few stores. Even then, information technology was used to meet the company motto: Retail happens daily. Data was sent back over the system each day and was then entered into a Radio Shack Corp. TRS-80 running Visicalc, the first spreadsheet.



Mrs. Fields' motto of retailing remains the starting point for developing computer systems.

"You need to build systems that report daily so you can really see what's going on and so that you can manage daily," said Paul Quinn, president of ROI, the Fields software group, which was recently organized as a separate affiliate by Mrs. Fields Cookies [CW, Sept. 17].

After the TRS-80s, Mrs. Fields bought an IBM Series/1, which offered a Touch-Tone data entry interface, so the stores could call in information via the telephone. But store managers found the system frustrating, because mistakes in data entry were difficult to correct.

So the company created an interface based around PCs, allowing store managers to see the data they entered on screen. Moving to PCs "was like opening floodgates," Quinn said, "because then the imagination went wild and said, 'What are all the other things we can do with that PC?' "

Quinn, who joined the company in 1984 and helped implement the PCs, then started to develop the company's first expert system to help solve its difficulty in effectively scheduling labor.

Mrs. Fields decided to build its own expert systems after examining and rejecting available commercial expert system shells. The decision has paid off as each of its five expert systems has paid for itself within six months.

The firm developed its own inference engine and its own knowledge base for the labor scheduling system and has installed it chainwide. Since it was fully implemented, the system has shaved 4% off company labor costs, adding the savings to its bottom line.

Waste not, want not

Mrs. Fields, like most fast-food chains, also faced production planning issues. Local managers had to have just enough cookies to meet demand with a minimum of waste. For this key function, the company had initially set broad production guidelines based on total store sales each day.

It decided to guide production for each store through a stand-alone PC-based expert system that has rules set up to gear production to each store's typical traffic flow. The system, also installed chainwide, has resulted in a savings of 6% of daily sales.

Another expert system is used to hire new store employees. The system develops a profile of each candidate, compares it with the desired employee profile and reports the results to the store manager.

The time benefits have been significant: Whereas month-end profit and loss analysis used to take two to three people at least two days, now only two hours are required.

The systems have given Mrs. Fields some unexpected benefits.

"Our training program changed radically after we put the expert systems in," Quinn said. "We weren't investing training dollars into managers on how to create a schedule and how to do a production plan, because they really didn't need to know. All they needed to know was push the button, and it's going to recommend something."

Mrs. Fields has realized significant cost savings from this, because the fast-food industry can generate employee turnover as high as 400% per year.

Another benefit surfaced when the company's controller left in June 1990. Thanks to one of the expert systems, much of his expertise stayed behind.

Despite kinks in Notes, most like what they see

BY PATRICIA KEEFE
CW STAFF

Lotus Development Corp.'s Notes groupware application has its problems, but it also holds a great deal of promise, according to users and analysts who have spent the last year intently studying the fledgling environment.

As observed last week [CW, Oct. 8], complaints about the way Notes is packaged — a flat entry price point of $62,500 for 200 nodes — has not dampened enthusiasm for the concept.

However, because even the most die-hard Notes fans have difficulty articulating exactly what Notes is — why it is more than just a bunch of office automation capabilities strung together and how it differs from integrated packages — it tends to fall into the "seeing-is-believing" category.

Recognizing that, Lotus has referred a host of users to Price Waterhouse, where they can see the application in action. Lotus is also hoping that partnerships with systems integrators specializing in vertical markets will provide users with further examples of how Notes can serve their organizations.

June Rokoff, vice-president of communications and the information services group, talks about getting clients to understand how they can interact with Notes and each other, be it in work groups, product development or in following an idea across the country.

Transformation tech

For example, she said, client applications can range from sharing corporate telephone books on-line to keeping track of events related to the company's business to on-line dialogues and conferences, which is how Chemical Bank uses it. Young & Rubicam, Inc., an advertising agency, uses Notes to manage client relationships, as does Price Waterhouse and the consulting services group at Lotus. Picking up on a theme brought forth by Price Waterhouse, Rokoff talks about "transformational technology."

"I see professionals throughout the company not tied to any location, in an electronic sense, [due to Notes]," said Brad Jackson, a senior consultant in Texaco, Inc.'s information technology department.

"Notes has the property that once you begin to use it, you begin to work in a very different way," said Frank Moss, vice-president of the consulting services group at Lotus. As an example, he cited his own use of Notes. Moss said he was accustomed to tracking projects using paper. But now that Lotus has all its projects on-line, Moss finds himself involved in fewer face-to-face meetings. "I make decisions now based on different information than I used to," he said.

Rokoff and Moss talk about Note's ability to change the way people work, a claim backed up by Notes users. As such, it is necessary to go out organizationally, Rokoff said, to make sure users see Notes and buy into it.

Once they do, according to Sheldon Laube, director of information technology at Price Waterhouse, they often need no prodding to move their group's applications onto Notes. In many cases at Laube's organization, users with limited technical skills have even begun to write applications for Notes. "It's incredible," he said.

David Marshak, an analyst at Patricia Seybold's Office Computing Group, agreed: "One of the things that excites those working with Notes is the ability to rapidly prototype applications; it's an easy platform to customize with." Among his clients, the applications being built on Notes tend to be those that deal with information essential to the client's line of business applications.

It is for these reasons that some observers said Lotus should concentrate on seeding any interested accounts with Notes rather than wrestling with users determined to pilot it.

DB2 ON YOUR PC

Develop full scale DB2 applications on your PC! Join the thousands of DB2 developers already benefiting from the productivity gains provided by the XDB-Workbench for DB2.

XDB puts a 100% DB2 compatible SQL DBMS and COBOL precompiler in your PC—seamlessly integrated with Micro Focus COBOL/2 Workbench and its CICS option for interactive development.

Multi-user development can be supported by the XDB-SQL Database Server in MS-DOS, UNIX, OS/2, and Netware 386 environments.

"The only tool available that adheres closely enough to IBM's DB2 to allow applications developed on the PC to be migrated to the mainframe with little or no modification."
PC Week
June 12, 1989

"Develop on PCs . . . then run the finished software without changes against DB2 data on mainframes thanks to XDB's DB2-compatible database server software."
DBMS
January 1990

Interested in DB2 power on a PC?

Call (301) 779-6030

XDB Systems, Inc.
7309 Baltimore Avenue
College Park, MD 20740
FAX (301) 779-2429

xdb

1990 XDB Systems, Inc. XDB is a registered trademark of XDB Systems, Inc. DB2 is a trademark of IBM. Other product names are trademarks of their respective holders.

How to make the work go fas

NEC PowerMate 386/25S.

The affordable entry to high performance 386 processing.

For advanced applications like CAD/CAM, presentation graphics or financial modeling, you can't go wrong with the PowerMate® 386™/25S. For far less than comparable 386 systems, you get 25MHz speed, 2MB

C&C
Computers and Communications

ter and the money go slower.

of RAM (easily expandable to 16MB via SIM modules) and a 32K memory

386 is a trademark of Intel Corporation

cache. You also get something you can't get from anyone else at any price:

PowerMate is a registered trademark of NEC Corporation

NEC. For more information call 1-800-NEC-INFO.

© 1990 NEC Technologies Inc.

NEC

Postscript challenger fades

Microsoft's page description language not expected until mid-1991

BY JAMES DALY
CW STAFF

SAN JOSE, Calif. — The tornado that ripped through last year's Seybold Publishing Conference generated scarcely a breeze at this month's fete as Microsoft Corp. Chief Executive Officer Bill Gates conceded that his once-ballyhooed challenger to Adobe Systems, Inc.'s entrenched Postscript page description language could remain a paper tiger until the middle of next year.

Gates said that the first general availability of Microsoft's and Apple Computer, Inc.'s collaborative Trueimage page description language and Truetype font technology will come with shipments of OS/2, Windows and Apple's System 7.0 in the first half of 1991. Early OEM versions of Trueimage were delivered last week, he added.

Last September, Gates and Apple CEO John Sculley jointly announced that they were developing their own Postscript alternative, a move that stunned Apple's longtime partner Adobe. Apple was an early investor in Adobe and the biggest customer of Postscript, a popular application that is often credited with launching the desktop publishing explosion that in turn made a fortune for Apple.

Within hours of the announcement, a visibly angered Adobe CEO John Warnock parried the move, announcing that he would "open up" Postscript by publishing its technical specifications.

Warnock has fought hard to combat Gates' charge that Postscript has become outdated.

"There's a myth that standards and innovation are mutually exclusive, when often just the opposite is true," Warnock said during the four-day Seybold conference earlier this month.

Fire under Adobe

As a result, Mountain View, Calif.-based Adobe has moved fast to shore up the defenses of its cash cow. In June, the company held a developers' conference for Postscript Level 2, which is slated to be available in the first half of 1991.

Warnock said the new package will beef up text and graphics functions as well as adding data compression capabilities and an improved memory management device.

Observers said that Truetype and Trueimage will face a difficult battle for the hearts and dollars of users.

Jonathan Seybold, an analyst at Malibu, Calif.-based Seybold Seminars, said it is likely that users faced with competing products will stay with the old familiar offering. "Postscript is a central fact of life to many, many people, and it'll be very difficult to change that," he said.

Gates acknowledged that both Trueimage and Truetype may eventually garner only a small market share, but he said that "both are sure to keep the market competitive in areas of price."

In other show news, C-Cube Microsystems, Inc. unveiled a pair of image compression add-in boards for Apple's Macintosh and IBM's Personal Computer AT and compatibles.

The Compression Master and Compression Master PC take advantage of JPEG image compression technology, which compacts bulky image files so they can be more easily stored and moved. The products cost $995 each.

Quark, Inc. announced that it will target several future development efforts toward IBM's line of PCs and workstations. Its first entry into the market will be to adapt its Quarkxpress/PC electronic publishing software to the IBM Personal System/2. That package is expected next year.

In addition, Digital Equipment Corp. and Adobe announced that they will work together to develop a unified approach to editable document interchange. The companies' work will be based on DEC's NAS Compound Document Architecture and Adobe's Postscript.

Zenith Data hops on PC price-cutting bandwagon

BY MICHAEL FITZGERALD
CW STAFF

MT. PROSPECT, Ill. — Zenith Data Systems recently cut suggested retail prices across the board on its desktop personal computers. The announcement means that the company has cut prices on its entire line of PCs within the last month.

The cuts implemented earlier this month, although worldwide, do not affect pricing of PCs based on the Micro Channel Architecture sold by Zenith's parent, Groupe Bull, in European markets.

The latest reductions ranged from an $1,800, 13% cut in the price of the Z-386/33E Model 320 to a $100, 3.7% drop in price for the Z-286 LP Plus Model 40 (now $2,599).

Zenith saved its steepest reduction for its Z-386SX Model 1, dropping the price from $2,999 to $2,299, a 23.3% cut. It also lowered prices by 18.9% on its best-selling desktop machine, the Z-386SX Model 40, dropping the price of that machine to under $3,000.

Despite the latest pricing moves, Zenith's top-of-the-line, Intel Corp. 80386-based 33-MHz machines — the Z-386/33 E Models 150 and 320 — remained priced at more than $10,000, with the Model 150 priced at $10,599 and the Model 320 at $11,999.

A Zenith spokesman called the price cuts a "business decision" for Zenith. The reductions follow recent broad cuts by other PC makers, including Compaq Computer Corp.

"It sounds like they just brought their prices more into line with what the market is accepting as price points," commented Steve Hess, executive vice-president at Creative Strategies, Inc., a Santa Clara, Calif.-based market research company.

"You can speculate that they may be doing this in anticipation of a softer market, because Zenith could probably have justified keeping their prices where they were, but now they're at a competitive price point," Hess said.

Rookies gaining ground on PC software superstars

BY RICHARD PASTORE
CW STAFF

For years, the microcomputer software market has been dominated by just a few packages: Lotus Development Corp.'s 1-2-3, Wordperfect Corp.'s Wordperfect and Ashton-Tate Corp.'s Dbase. Though the market leaders are holding fast to their massive installed base, upstarts are beginning to gain significant ground, according to recent buying-pattern surveys.

Wordperfect and 1-2-3 continued to lead the pack in sales at the 14,678 U.S. sites with 500 or more employees surveyed by Computer Intelligence in La Jolla, Calif. A key to their ongoing success is corporate buying inertia, said Dan Ness, personal computer analyst at Computer Intelligence. Cost factors associated with training, installation and support encourage the status quo and discourage software experimentation at larger firms, he added.

But two packages from Borland International are making sales strides, thanks to lowered defenses at Ashton-Tate and Lotus. Because both Lotus and Ashton-Tate have experienced major delays in releasing new products, Borland's Quattro Pro and Paradox have been able to slip in and make their presence felt, Ness said.

While 1-2-3's three-month average sales have tailed off by 5% since March, Quattro Pro has gained a couple of percentage points, according to surveyed firms. Paradox has doubled its 12-month average sales since June 1989, while Dbase IV has remained flat.

Also coming on like gangbusters is Microsoft Corp.'s Windows operating environment and Microsoft Word word processing package, which have gained five and six sales percentage points since March, respectively.

Coupled with Microsoft's Excel, the country's largest PC software house has logged a 12% gain in average sales from March through July, the survey showed. Analysts predicted continued growth for Microsoft, with sales in the $1.5 billion range next year.

Rounding out the list of the Top 15 hottest-selling software packages this summer in descending order were the following: Wordperfect; 1-2-3 Release 2.2; Microsoft Word; Quattro Pro; Excel; Software Publishing Corp.'s Harvard Graphics; Windows 3.0; 1-2-3 Release 3.0; Central Point Software, Inc.'s PC Tools; Ashton-Tate's Multimate, Dbase III and Dbase IV; Datastorm Technologies' Procomm; Symantec Corp.'s Q&A; and Fifth Generation Systems, Inc.'s Fastback.

Forward progress

Penetration of PC applications software packages into U.S. sites with 500 or more employees

Lotus' 1-2-3	89%
Wordperfect's Wordperfect	63%
SPC's Harvard Graphics	38%
Aldus' Pagemaker	36%
Microsoft's Windows	33%
Microsoft's Excel	26%
Microsoft's Word	26%
Autodesk's Autocad	26%
Wordstar's Wordstar	24%
IBM's Displaywrite	20%
Xerox's Ventura	19%
Lotus' Symphony	19%
Ashton-Tate's Multimate	16%
Lotus' Freelance+	15%
Borland's Quattro, Quattro-Pro	12%

Source: Computer Intelligence
CW Chart: Marie Haines

COST FACTORS associated with training, installation and support encourage the status quo and discourage software experimentation at larger firms.

Let CICS Manage Itself

Automate Your CICS Regions with AOEF

- Start, stop and recover CICS regions.
- Time initiate transactions, batch job support and CEMT commands.
- Monitor and correct terminal status.
- Trigger journal jobs on demand.
- Ship early problem warnings to consoles, TSOids and to the HELP desk.
- Respond to CICS's WTOs, WTORs, abends and log messages with MVS activities, predefined WTOR responses and corrective CEMT commands.

The CICS Automated Operations Extension Facility is a proven approach to system managed CICS resources. Call us today for more information or a trial for AOEF

Netec International, Inc.
P.O. Box 180549 • Dallas, TX 75218
Telephone (214) 343-9744
FAX (214) 343-9009 • TLX 314419

MICROCOM

FEATURING MNP 10 WITH ADVERSE CHANNEL ENHANCEMENTS

NEW QX/4232hs V.42 AND V.42BIS MODEM: MORE THAN JUST COMPLIANCE IT'S INNOVATION

In the world of high performance modems, no one is thinking smarter or faster than Microcom. Which is why the new Microcom QX/4232hs™ can put the world at your fingertips at speeds up to a blistering 38,400 bps.

The QX/4232hs is fully V.42 and V.42bis compliant, features MNP® 10 — the newest class of the Microcom Networking Protocol™, the industry standard for data compression and error correction. This new high performance modem also provides UUCP and Kermit protocol support.

Besides speed, compliance to leading international standards, and MNP 10™ with its Adverse Channel Enhancements™ for error free transmission under the most difficult line conditions, the QX/4232hs also offers PCS™ — Microcom's Password Connection Security™ — for password protected access and Microcom Remote Access™ for configuring and troubleshooting remote sites.

We set the standard for the modem industry and now we're setting standards for price and performance too. That's innovation.

FREE GUIDE

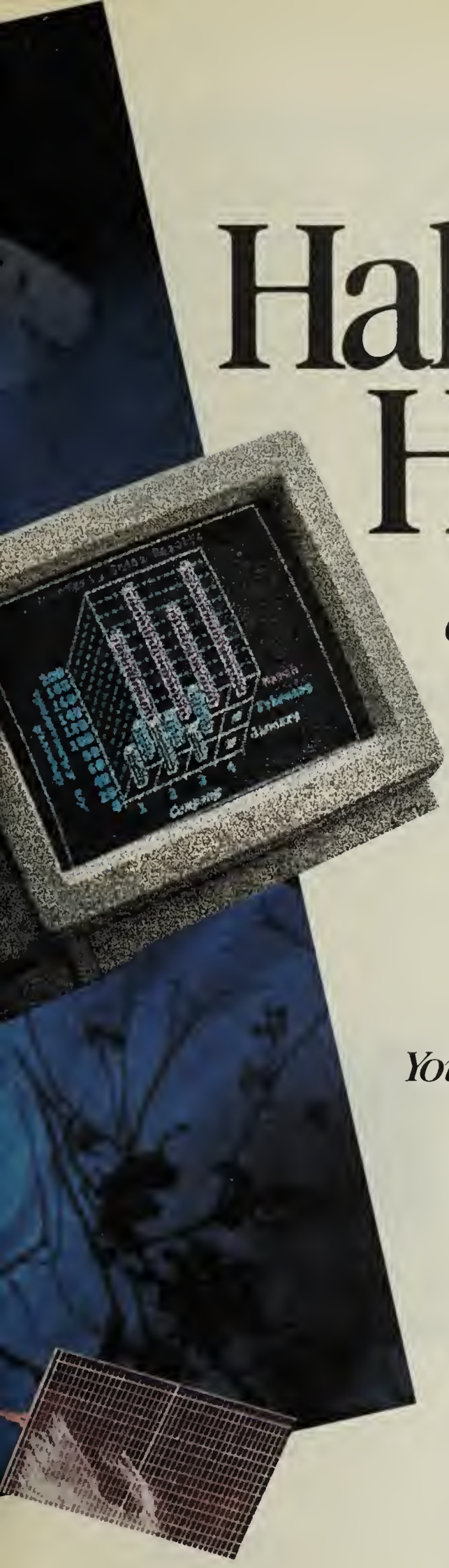
We've prepared an informative technical brief entitled "Microcom Networking Protocol." If you are in the market for a high performance modem that meets international standards, call us now at **800-822-8224** and we'll send you a copy.

Microcom

MNP is a registered trademark of Microcom Systems, Inc. QX/4232hs, Microcom Networking Protocol, MNP 10, Adverse Channel Enhancements, PCS, Password Connection Security, Remote Access are trademarks of Microcom Systems, Inc.

© Microcom, Inc. 1990, All rights reserved.

WHILE YOU WERE OUT
URGENT



Half Network, Half Beast

Or, How You Can Tame Out-Of-Control Communications.

In the communications jungle, you'll find a beastly assortment of computers and phones. And networks of every species. An electronic menagerie that has to be tamed to be useful. To do the things you want. No matter what Mother Nature (or Father Time) throws at it. That's where your local phone company and AT&T come in. Using an AT&T 5ESS® Switch and AT&T Fiber, your local phone company can teach your existing networks tricks you never thought possible. Like making them connect and talk to each other. In short, with AT&T, your local telephone company can make your networks heel to your every command.

Real-World Solutions From Your Local Phone Company and AT&T

AT&T
Network Systems

© 1990 AT&T

Mallach

CONTINUED FROM PAGE 41

had. Microcomputer distribution channels evolved during the 1980s for a particular class of system having certain general characteristics and, therefore, certain appropriate selling processes. Those channels are no longer the only answer — or, for OS/2, even a correct one. OS/2 promoters are making a big mistake by trying to force the product through channels that were designed for something quite different.

Consider retail computer stores. Since they began, they have focused on relatively simple systems — typically, single-user systems designed to do one user-visible thing at a time. It doesn't take a great deal of time to demonstrate their value; hence, the selling process is relatively short, and competition is often based on price, with margins correspondingly low. Even direct sales to large corporate users follow this pattern.

Now enter OS/2, stage left, as the purported replacement for MS-DOS. It calls for more hardware, but that's a transitory problem, not a fundamental issue. Today's MS-DOS calls for far more hardware than CP/M did, but nobody complains. Ditto for a Mac with less than 1M byte being next to useless — and make that 2M bytes next year.

If people really wanted OS/2, they'd pay for the hardware. The key reason people aren't buying OS/2 is that existing desktop computer distribution channels can't sell it.

OS/2 is a fundamentally different beast from MS-DOS. OS/2 has all the modules, all the interfaces and all the complexity of VMS a few releases back. The only thing it does not have in common with the VMS of 1985 or so is a six- or seven-figure price tag for the hardware. That difference is not enough to change the nature of the selling process.

Also, the channels through which most desktop micros move have never succeeded in selling Unix-based systems or anything else of comparable software complexity. Hardware cost is not the reason. The same stores that can't move a $5,000 Unix box or OS/2 system routinely sell $10,000-plus Macintosh IICIs and IBM Personal System/2 Model 70s.

No, a key reason is their inability to deal with an extended sales cycle based largely on future potential. If I buy MS-DOS to run accounts receivable, I can see the relevance of every major MS-DOS feature to that accounts receivable job. If I look at OS/2, I am told, "You can run MS-DOS A/R now, and you'll get lots more good stuff later." What good stuff, and what will it do for me? "I don't know," the sales rep says, "and what's more, I don't care, and I'm not going to waste my valuable time trying to find out when I could be selling more MS-DOS systems."

This ability to sell future benefits — not benefits of future products, but future benefits of today's products — has been the large-system salesperson's stock-in-trade for years. IBM is known for conducting detailed studies of users' long-term needs. That's what it takes to sell complex systems, and that's what existing microcomputer distribution channels can't or won't do.

A look at the few folks who *are* buying OS/2 bears out the same lesson. As a group, they tend to be large organizations whose staffs have both technical and business savvy and whose planning horizon is longer than a year. If they see reasons to buy OS/2, there must be some pretty good ones. If other people don't see the same reasons, either their needs are consistently different — which is not plausible — or something is wrong with the way they are being approached.

Those who want OS/2 to take off must create sales channels that will enable it to do so. The sooner Microsoft and its colleagues learn the Acura lesson — assuming they really do want OS/2 to take off — the sooner they will get results.

Mallach is a faculty member at the University of Lowell in Lowell, Mass., and a consultant to users and vendors.

Computervision upgrades CADDS

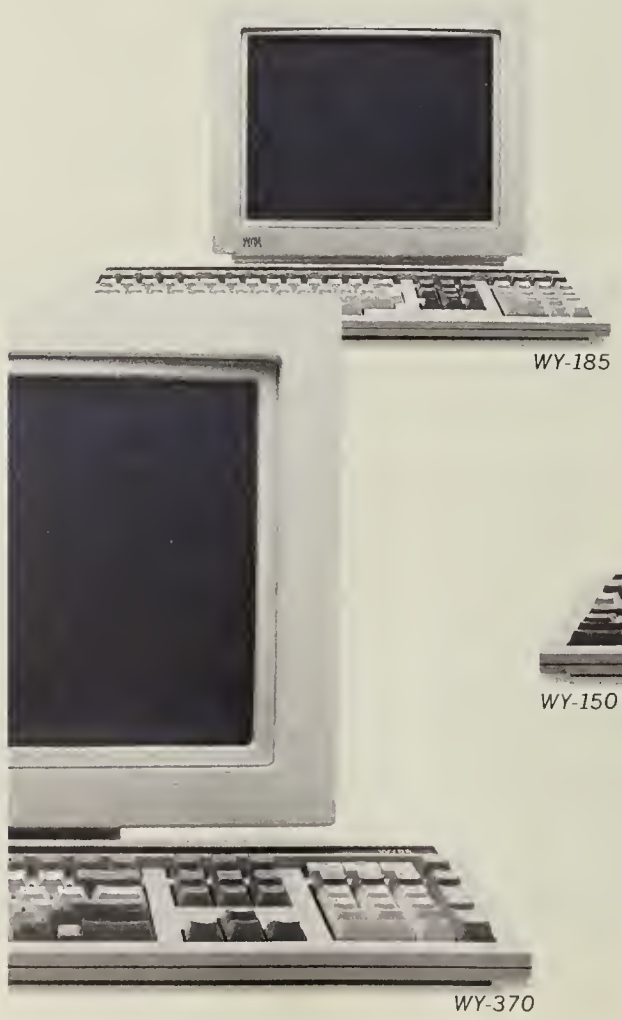
BEDFORD, Mass. — Computervision, a Prime Computer, Inc. company, recently expanded its CADDS 4X mechanical computer-aided design and manufacturing (CAD/CAM) software line by unveiling a version of its CAD/CAM/CAE package designed to accelerate each phase of the engineering process — from functional design and design modeling through engineering analysis and documentation to manufacturing engineering.

Components offered in Release 6.0 reportedly include a solids editing tool to simplify the changing of solid models developed in CADDS 4X; an assembly design program to accelerate the design of large mechanical assemblies; thermal analysis software to aid engineers in assessing heat transfer problems; and easier machining of complex parts.

A CADDS Raster component is also available that allows users to view, edit and store raster-based images of their paper-based engineering documents in the CADDS environment. Pricing for the individual components ranges from $8,500 to $15,000, with the GCN solids editing tool provided to current Solidesign II users as part of the Release 6.0 upgrade.

SALLY CUSACK

Wyse sets the standard in terminals again.
And again. And again. And again.



WYSE is a registered trademark and WY-150, WY-370, WY-185 & WY-160 are trademarks of Wyse Technology Inc. Tektronix is a registered trademark of Tektronix Inc. DEC is a registered trademark of Digital Equipment Corp © 1990 Wyse Technology Inc

DG plants feet firmly on I486 ground

BY SALLY CUSACK
CW STAFF

WESTBORO, Mass. — Data General Corp. officially stepped into the Intel Corp. I486-based ring this month, trumpeting a high-end, 25-MHz personal computer system.

"This is their opportunity to solidify themselves in the 486/Unix side of the server world," said Paul Zagaeski, a senior analyst at The Yankee Group. He estimated that 75% of all I486-based machines are purchased for use in a server capacity.

According to DG, the Dasher/486-25 is directed at sophisticated users looking for high performance and upward expansion options and provides a suitable platform for multiuser Unix applications and Novell, Inc. Netware networks.

The base system, priced at $7,995, provides 4M bytes of memory on a 32-bit controller, a dual-floppy disk controller, an IBM Personal Computer AT-compatible keyboard, a 16-bit Video Graphics Array controller card and eight expansion slots.

For memory above 16M bytes, another memory controller can be added to bring the total system memory up to 32M bytes. The system accommodates up to five half-height 5¼-in. drives, the firm said, which allows the user to combine multiple hard disks for fault-redundant Novell networking with tape backups and on-line storage of 1G byte.

The Dasher/486-25 is available immediately and includes a one-year warranty with a toll-free telephone support center, overnight express shipment of replacement parts and telephone or on-site assistance. The system ships with MS-DOS Version 4.01, QEMM-386 and menu-driven user diagnostics.

Mainframe

CONTINUED FROM PAGE 41

ware, including what-you-see-is-what-you-get capabilities, he said.

Other benefits include eliminating the need to translate software and reducing drain on the mainframe, analysts said.

Yet a trend toward distribution may hamper user acceptance of centralized printing. "Decentralization is what's happening with printers all over the place," said Michael Peterson, president of Peripheral Strategies in Santa Barbara, Calif. "The lower the cost goes, the sooner we're going to get to one per office."

A centralized printing source runs counter to users' desire for local control of their output, added Gabriel Kasperek, president of network consulting firm Kazcom, Inc. in Park Ridge, Ill. "The issue is who's going to gain power over it."

Similar concerns were voiced about who will manage the Xerox system. "If this [machine] is outside the purview of information systems, then who manages it?" asked John Dunkle, vice-president at Workgroup Technologies, Inc. "Especially given the networking and integration issues, that could be a problem."

The size and cost of such systems may also be out of whack for most PC network installations. "That's a lot to bite into for a typical company running LANs," Kasperek said.

Kodak said Lionheart would be economically sound for organizations with a printing need of 500,000 pages per month. The average desktop laser unit manages 1,000 to 2,000 pages per month.

"The markets where that [volume capacity] would be viable would be very selective," said John Hoper, president of printer consultancy Omnimark in Dallas.

Printing shops, publishing houses, insurance and brokerage firms and some banks may have the volumes to use such a system, Hoper said.

Senior West Coast Editor Jean Bozman contributed to this report.

MICRO BITS

Free 1-2-3 with Powermate PCs

Lotus Development Corp. and **NEC Technologies, Inc.** are offering a coupon until Dec. 31 for a free copy of Lotus' 1-2-3 Release 3.1 to buyers of NEC's 386SX, 386 and 486 Powermate personal computers. Purchasers also get a free copy of **Microsoft Corp.**'s Windows 3.0

Computerland Corp. has standardized on **Da Vinci**'s Da Vinci E-mail throughout its corporate offices and 750 outlets, after evaluating half a dozen other electronic mail packages. Da Vinci will replace a mainframe-based E-mail application.

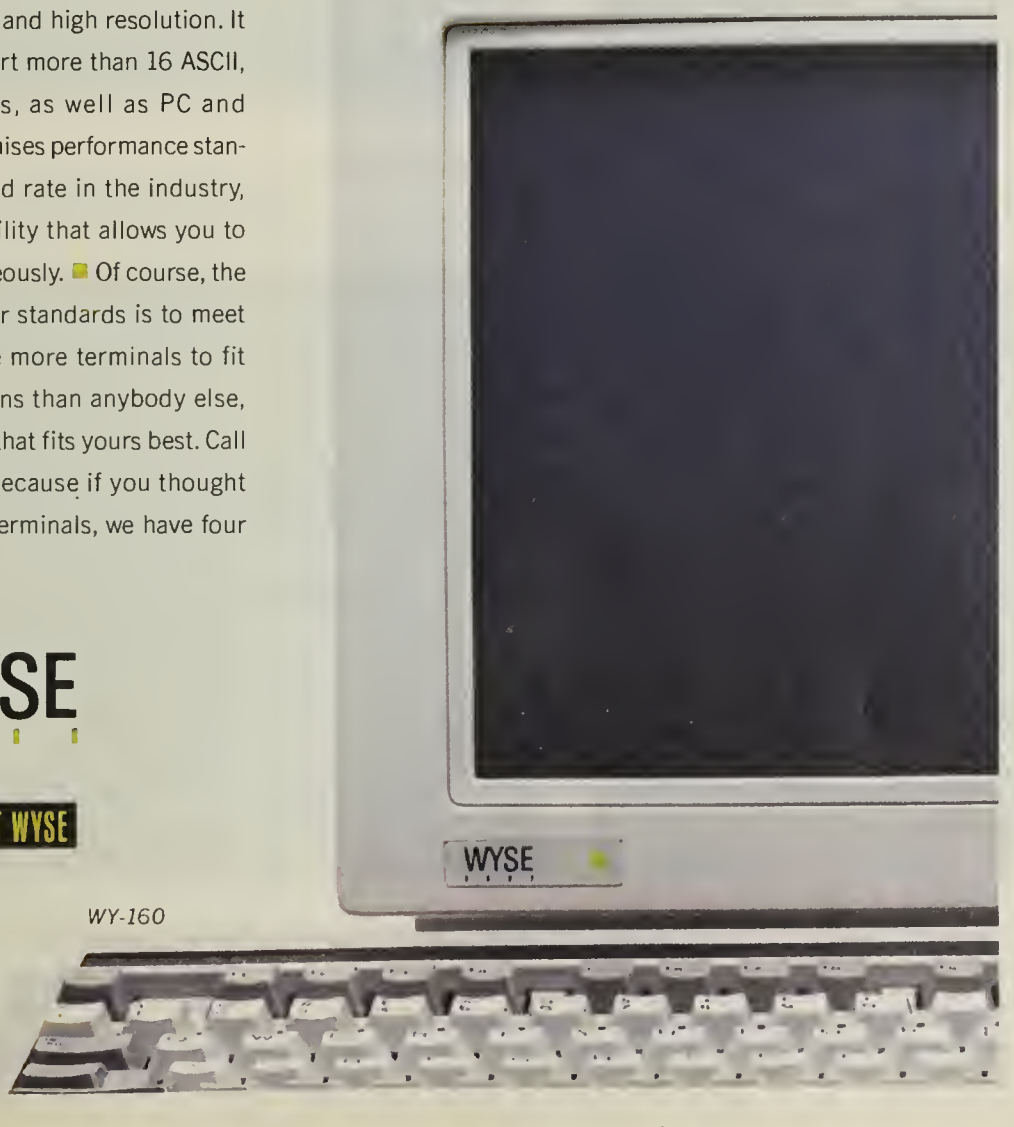
The **U.S. Defense Electronics Supply Center** has awarded a $12.1 million contract for dual-drive compact disc/read-only memory units to **Sony Corporation of America**. The defense group will use the external drives in combination with IBM Personal Computer compatibles for office automation applications and to store and access parts catalogs and federal stock numbers.

Wyse became the number one manufacturer of general purpose terminals by repeatedly redefining the state of the art in terminal design. Not just in one category, but across the board. And with the four terminals that make up our fourth generation, we've done it again. Each one represents the ultimate achievement in its class. Our WY-150 sets the standard for alphanumeric monochrome terminals. The WY-370 brings unprecedented functionality in color. And the WY-185 is the most advanced DEC-compatible. Our newest entry, the WY-160, offers a combination of features found in no other monochrome terminal. It lives up to Wyse's well-known ergonomic standards, with its full-screen overscan, fast refresh rate and high resolution. It has the flexibility to support more than 16 ASCII, ANSI and PC emulations, as well as PC and Tektronix graphics. And it raises performance standards with the fastest baud rate in the industry, plus a dual-session capability that allows you to access two hosts simultaneously. Of course, the reason we keep raising our standards is to meet yours. And since we make more terminals to fit more system configurations than anybody else, we're sure to have the one that fits yours best. Call us at 1-800-438-9973. Because if you thought you'd seen everything in terminals, we have four reasons to look again.

THE WORLD IS GETTING WYSE.

WYSE

1-800 GET WYSE



WY-160

Eight Top Databa
Out On dBAS

ADAM GREEN
President, Adam Green Seminars, Lexington, MA:

"It's significantly faster in some very important areas, especially in the fancy, attractive user interface... It's a very stable product, very reliable. I can safely recommend it."

PAT ADAMS
President, DB Unlimited, Brooklyn, NY:

"With standardization on the dBASE IV language, we have our database standard, which makes life easier for me, for my clients, and every other dBASE user... It's a solid, reliable product that performs the same way every time."

BOB DAVIES
President, SBT, Sausalito, CA:

"Memory utilization is much better than either dBASE III PLUS or dBASE IV version 1.0—a very substantial improvement. This means we are able to run our products, which require lots of memory and the need for a network, in a dBASE IV 1.1 environment."

SCOTT ROBERTSON
President, Champion Business Systems, Golden, CO:

"We think that it's solid. We think it's reliable. We think it's an excellent foundation for future development. The great thing about dBASE IV is that it has a flexible language and a good user interface. With dBASE IV version 1.1, end-users can take the product and tailor it so it fits their exact needs."

After running their own extensive tests, these independent experts have come to some very favorable conclusions on dBASE IV® version 1.1. We think you will, too.

dBASE, dBASE III PLUS, dBASE IV, Ashton-Tate and the Ashton-Tate logo are registered trademarks of Ashton-Tate Corporation. Other company or product names mentioned may be trademarks of their respective companies

se Experts Speak
E IV Version 1.1.

TONY LIMA
Author of "Inside dBASE IV," President, Pacific Systems Design Workshop Inc., San Carlos, CA:

"Version 1.1 should dominate the market. Its added features make it the best development environment available for PC database products ...None of the other products have the power and ease of the dBASE IV Control Center."

HOMER BRANCH
Programmer Analyst, Chevron CEPS, New Orleans, LA:

"I'm using version 1.1 to develop applications right now... It's much easier to use than either dBASE III PLUS or 1.0... Because of the Control Center, version 1.1 allows my users to do queries and get their reports without calling me."

RICHARD BRENNER
President, Westar Systems, Colorado Springs, CO:

"I'm now taking on some major consulting jobs that I wouldn't do before dBASE IV and its multiuser capabilities... I'm excited about the way they've gone through and enhanced just about every one of the new features within the program and the programming language."

SAM GILL
President, DataWiz International, Foster City, CA:

"dBASE IV version 1.1 is significantly faster... Memory management has really been improved. We can now load and run a system very comfortably in 640K bytes... Features like the form, report and application generators allow us to cut down development time."

Call 1-800-437-4329, ext. 1403, for more information. Better yet, call 1-800-2ASHTON for an immediate upgrade.

Ashton-Tate®

© 1990 Ashton-Tate Corporation. All rights reserved. GTSI's GSA Schedule # GS00K90AGS5216

NEW PRODUCTS

Systems

Grid Systems Corp. has introduced an IBM Personal Computer-compatible laptop that features a built-in pointing device.

The Gridcase 1550-SX includes a proprietary pointing device in its battery-powered Gridcase that enables users to fully utilize the features of Microsoft Corp.'s Windows 3.0. A standard unit includes a 20-MHz Intel Corp. 80386SX processor, a 60M-byte hard disk drive and Windows 3.0.

A standard configuration costs $6,295, and a version with a 120M-byte hard drive is priced at $6,995.

Grid Systems
47211 Lakeview Blvd.
Fremont, Calif. 94538
(415) 656-4700

Samsung Information Systems America, Inc. has announced a portable computer that provides users with all the features of a desktop system.

The S3600 includes an Intel Corp. 80286 microprocessor, 1M byte of random-access memory and a 3½-in. 1.44M-byte floppy-disk drive.

A backlit Video Graphics Array screen yields 16 levels of gray at a 640- by 480-pixel resolution. Traveling Software, Inc.'s Laplink III software package is included free with the S3600 until Dec. 15, the vendor said.

The product is priced at $140.

Samsung
3655 N. First St.
San Jose, Calif. 95134
(800) 446-0262

Software applications packages

Macromind, Inc. has announced a software tool for integrating video with graphics, animation, text and sound when producing videotapes or video presentations on Apple Computer, Inc. Macintosh systems.

Macromind Mediamaker includes a print-to-tape feature that enables users to create videotapes for distributing their presentations. System requirements include a Macintosh Plus, II, SE, SE/30 or portable running Apple's System 6.05 or higher. A hard disk, 1M byte of memory (for black-and-white applications) and 7M bytes (for color applications) are also needed.

The product is scheduled to be released in the fourth quarter for $495.

Macromind
410 Townsend
San Francisco, Calif. 94107
(415) 442-0200

Prentice Hall Professional Software Corp. has introduced a knowledge-based personal computer financial analysis software product designed to help accounting firms analyze clients' financial and operating data.

Answers enables users to accept financial data from more than 70 different accounting packages, as well as from packages such as Lotus Development Corp.'s 1-2-3. System requirements include an IBM Personal Computer AT, Personal System/2 or compatible equipped with 640K bytes of memory and DOS Version 3.0 or higher. It is priced at $595 for a single-user version and $1,495 for unlimited use at one location.

Prentice Hall
2400 Lake Park Drive
Atlanta, Ga. 30339
(404) 432-1996

Training

Strategic Management Group, Inc. has announced an interactive self-study program designed to help users understand financial terminology, financial reports, profitability and other financial training applications.

The product combines a four-part workbook, case studies, exercise review questions and a computer-based business simulation. It runs on an IBM Personal Computer AT or XT, Personal System/2 or compatible and requires PC-DOS Version 2.0 or higher, 512K bytes of random-access memory, two disk drives or a hard drive.

The product is available for $300, the vendor said.

SMG
3624 Market St.
University Science Center
Philadelphia, Pa. 19104
(215) 387-4000

Board-level devices

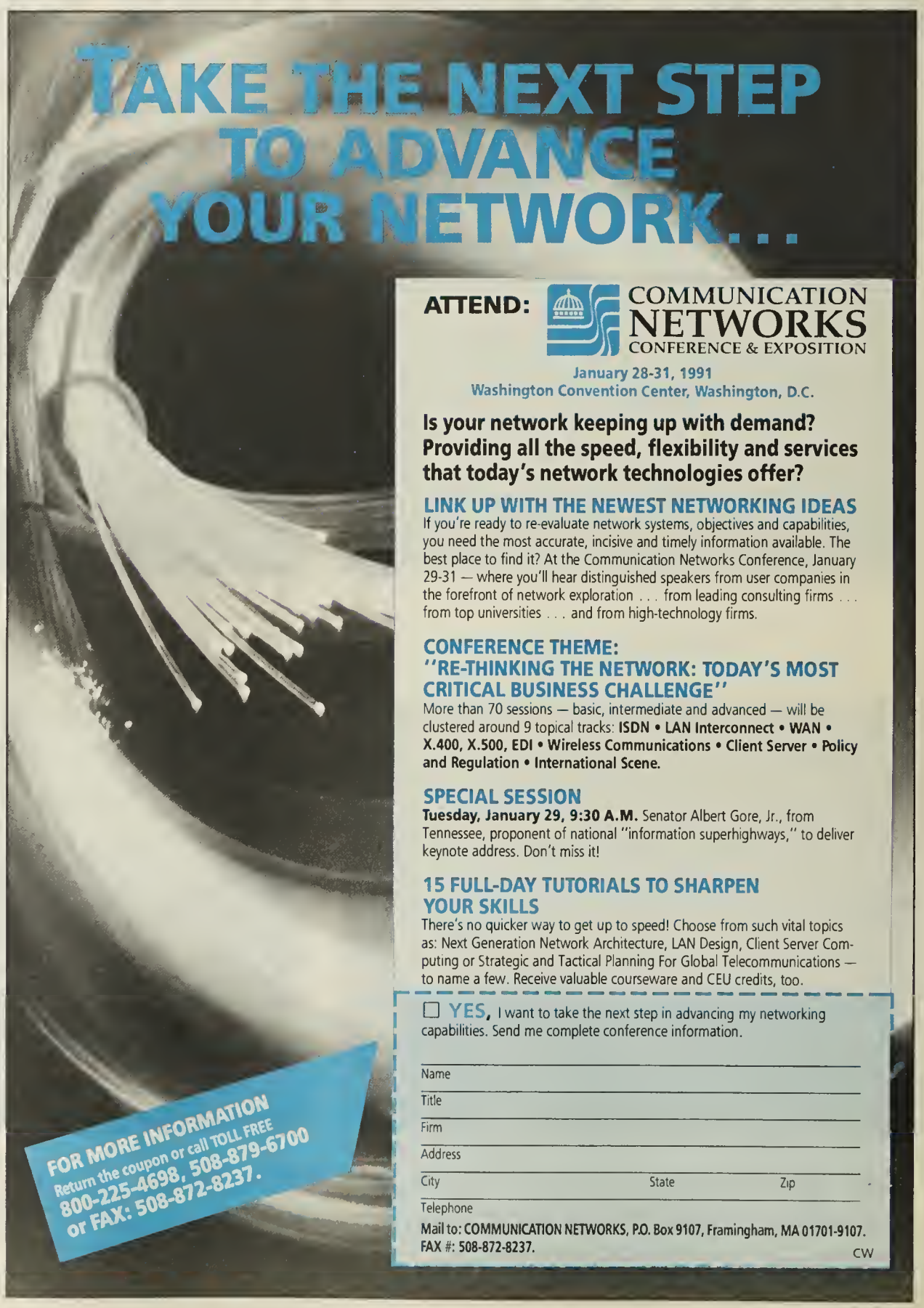
Ariel Corp. has announced two digital signal processing coprocessor cards designed for Sun Microsystems, Inc.'s Sparcstation 1+, Sparcstation IPC and Sbus-compatible computers.

The S-56 and S-56X single-slot Sbus boards are based on the Motorola, Inc. DSP56001 chip and are reported to operate at 13.5 million instructions per second.

The cards also feature up to 192K bytes of zero-wait-state memory and a digital signal processing port with a maximum synchronous transfer rate of 6.75M bit/sec., the vendor said.

The S-56 and the S-56X boards are priced at $2,495 and $2,995, respectively.

Ariel
433 River Road
Highland Park, N.J. 08904
(201) 249-2900



IDC WHITE PAPER

The Pick System Environment

EXECUTIVE SUMMARY

In this day of hostile takeovers and faceless corporations, it is refreshing to come upon a privately held company still based on the vision of its founder. Indeed, 25 years after he converted his dream to reality, Dick Pick remains the guiding light behind Pick Systems. A lot of promising companies have come and gone in that time, but Pick persists.

Not only does the company persist, but it prospers. Building upon its innovation of the early days, the Pick environment has expanded to embrace today's technology. No longer just an operating system, Pick has reached out to the information systems world by developing a relational database management system. This has made it a player in the UNIX and MS-DOS worlds.

Ease of access and use distinguish the Pick environment. The way various levels are presented lends itself to a logical understanding by users, allowing them to navigate through these levels without the aid of programmers. This ability to view data without concern for how the database management system software has to handle fields, records, files and strings makes Pick a powerful query and information retrieval model. Advanced Pick enhances ease of access and use by making it even easier for end users to browse through data.

Despite its innovative past and aggressive plans for the future, Pick is still competing in a hostile world. The Pick environment has a host of strengths to see it through. Its original design, the single vision of Dick Pick and its application base of over 3,000 products place it in a strong competitive position. However, Pick must contend with threats such as its limited marketing, hostile advances from larger database companies and the possibility, however remote, of an outside acquisition.

If the company parrys these threats, IDC believes it is poised to thrive in the '90s.

THE PICK SYSTEM ENVIRONMENT

AN IDC WHITE PAPER FOR INFORMATION SYSTEMS MANAGEMENT

THE HISTORY OF PICK

The Six Goals of Pick

KEY SUCCESSES IN THE PICK DESIGN

The Pick Data Model
The Correlative Concept
The Data Dictionary
The Pick File System

THE PICK FILE SYSTEM

The System Level
The Account Level
The Dictionary Level
The Data File Level

THE PICK ENVIRONMENT TODAY

Movement to Industry-Standard Operating Systems
Pick and MS-DOS
Adding DBMS and Applications to the Operating System Mix
Advanced Pick

PICK IN THE '90s

PICK WEAKNESSES

PICK OPPORTUNITIES

THREATS TO PICK

PICK STRENGTHS

SUMMARY

PICK

THERE ARE PRODUCTS THAT ARE CONSIDERED CLASSICS DUE TO AGELESS DESIGN AND CONTINUING FUNCTION. WORDSTAR, I-2-3 AND THE VAX ARE AMONG THEM. WITH SUCH PRODUCTS, THE PASSAGE OF TIME ONLY SERVES TO REINFORCE THE CORRECTNESS OF THE EARLY VISION, THE UTILITY OF THE INITIAL DESIGN. THE PICK SYSTEM BELONGS ON THIS LOFTY LIST OF INFORMATION INDUSTRY CLASSICS. ■ ALTHOUGH IT HAS DEVELOPED INTO AN APPLICATIONS-BASED DATABASE MANAGEMENT SYSTEM (DBMS), PICK WAS THE FIRST OPEN OPERATING SYSTEM FOR GENERAL BUSINESS USAGE. IT TOOK A DIFFERENT TACK FROM ITS CONTEMPORARY COMPETITOR, UNIX. PICK WAS ORIGINALLY ORIENTED TOWARD BUSINESS APPLICATIONS WHEREAS UNIX WAS USED FOR SOFTWARE DEVELOPMENT. ■ IN ITS INITIAL IMPLEMENTATIONS, THE PICK ENVIRONMENT WAS DEVELOPED ON

minicomputer-level products for small–and medium-sized businesses. It was first implemented on Microdata systems, but moved to a large number of additional platforms in the late '70s.

The key to its design was the multi-user BASIC environment with its reporting capability and query access. These traits allowed the casual business user, who was not a computer professional but needed information, to run his business. This orientation toward the information content in the data files was a unique feature to Pick in its early days.

If you are talking about Pick Systems–the name of the company –you have to talk about Dick Pick himself. Although Dick Pick and Don Nelson were instrumental in the early design of the system, Dick Pick provided the single vision and driving force behind the Pick environment. His single-minded focus enabled Pick to weather many storms and changing trends in the industry.

Pick has endured because concepts thought of as leading edge in the '90s were implemented by Pick in the '70s. Features such as information access, global data dictionaries, end-user programming and application portability are not news to Pick users, who have enjoyed them for 20 years.

This IDC White Paper provides the reader with a clear statement of the genesis, current capabilities and outlook for the Pick environment. Although some that are short-sighted might dismiss Pick from their plans, the utility and function of this open computing environment demand more than cursory examination.

THE HISTORY OF PICK

The factors that influenced the development of the Pick system are not in the same mold as those that shaped

The Pick timeline

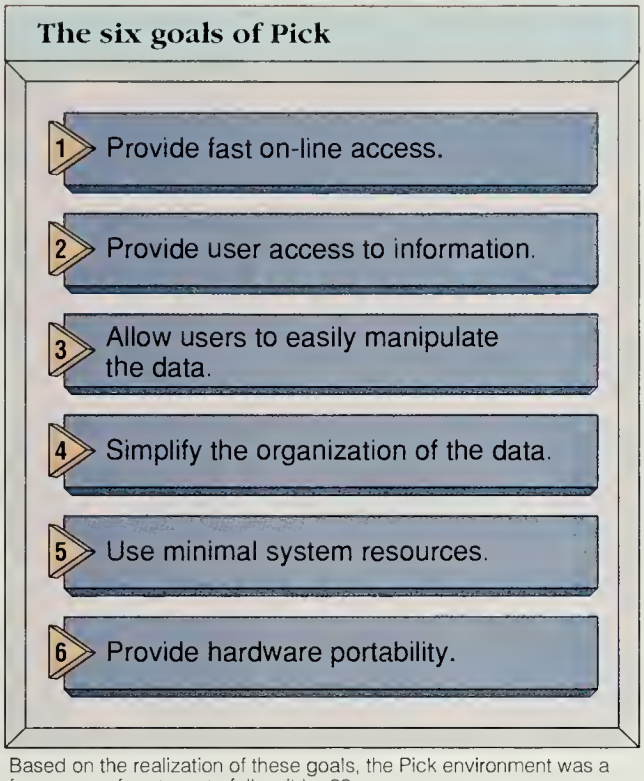
1965	Dick Pick and Don Nelson start work on GIRLS for TRW.
1969	Pick and Nelson deliver their software to the Army.
1972	Pick incorporates Richard Pick & Associates.
1973	First commercial introduction of Pick occurs on Microdata 1600.
1976	Dick Pick splits with Microdata.
1977	Ultimate Corp. becomes second licensee.
1981	Pick system implemented on IBM Series/1.
1984	Pick system released for IBM PC XT.
1985	Pick system released for IBM PC AT.
1988	One millionth Pick user, and implementation for IBM RT PC.
1989	Pick announces availability of Pick data base for UNIX.
1990	Pick ships Advanced Pick on AT&T UNIX, IBM AIX and SCO/UNIX platforms.

Pick's distinction as an industry classic dates back to its 1965 origins.

thousands of other engineering projects. As we shall see, the Pick System is an outgrowth of business requirements, not technology problems.

The precursor to this unique environment was described uniquely by the U.S. Army in 1965, as the "Generalized Information Retrieval Language and System," or GIRLS for short. The name was subsequently changed to "General Information Management." Used as an information retrieval tool, its first business application was tracking parts for the Army's Cheyenne helicopter project. At this point, its name was changed again to Integrated Technical Data System (ITDS).

After the completion of this project, Dick Pick continued to refine the concepts found in ITDS and explore the possibilities for its use in the commercial processing environment. As a result of this 1972 work, in 1973, the environment was ported to the Microdata 1600 processor with limited success, as the 1600 achieved only a 7% market share in the small computer market.



Based on the realization of these goals, the Pick environment was a forerunner of systems to follow it by 20 years.

The Six Goals of Pick

Given the successes with the Army, and the burgeoning market at the time for minicomputer products, Dick Pick founded Pick and Associates in 1972. The new company's immediate goal was to continue development on the Microdata 800 that was originally started on its predecessor, the Microdata 1600.

The new company had six primary goals:

- Provide a highly productive development environment
- Provide a highly productive end-user environment
- Reduce keystrokes for non-expert computer users
- Simplify the organization of the data
- Use minimal system resources
- Provide hardware portability.

Although IDC readily admits that advances in processor and system technology have enhanced the ability of vendors in general to deliver performance, it is the fulfillment of these underlying six points that makes for the timelessness of the Pick design and its appeal to users.

Between 1973 and 1977, when the Microdata systems were achieving their limited success in the market, Microdata had what amounted to a monopoly on Pick. However, in 1977 there was a falling out between the two, which became an opportunity for Pick to support other systems.

During 1978 and 1979, new licensees such as Intertechnique, Ultimate Corp. and ADDS paid fees reported to be over $1 million for their ports. However, the distinction of the first port went to the Honeywell Level 6 minicomputer, which achieved this milestone in the form of a product made by its licensee, Ultimate. Porting efforts really heated up in 1981 and 1982 when the IBM Series/1 and 43XX, and models from Pertec, SMI and Altos were all added to the base of Pick-capable systems.

Despite Pick's limited success at the time, clones were springing up. In 1977, a company called Devcom started developing a product that eventually became the Prime Computer, Inc. "Information" series. In 1982, the Pick-based Revelation system from Cosmos came to market for MS-DOS and the MS-DOS-oriented retail market. Finally, in 1985 VMark Software developed a Pick derivative to run under UNIX. All of these products had some incompatibilities with Pick, but all embodied the same heritage of usability, information access and efficiency.

Currently, sales of hardware using the Pick environment approaches $2 billion a year and there are three million users, all of whom are taking advantage of one of the most consistently useful environments for users with business problems.

KEY SUCCESSES IN THE PICK DESIGN

Calling Pick a classic in an industry where there are so few implies the company has realized some incredibly

How To Keep Your PC Working After Thirtysomething.

Try connecting more than 30 busy PC users on a LAN and you'll turn grey before your time. Even your thirtysomething operators will start sprouting a few grey hairs before they're able to get any real work done.

Put them on a Pick System and they'll be up and running in no time at all. As many as 33 users sharing a common database application and accomplishing multiple tasks with the trouble-free ease, power and speed only a true multiuser relational database system can deliver.

You don't even need PC's. A single PC/386 will drive 32 low-cost terminals (or PC's for that matter) just fine. With much faster speed and response time than other comparable multiuser database management systems. And Pick is specifically designed as a multiuser business applications system that is easy to use, update and modify as your business needs grow.

No matter how many users you need, the Pick System grows with you. The same Pick application can run on most major computer hardware ranging from PC's, to mid-range minicomputers, RISC-based systems and fault-tolerant mainframes.

There's no other relational database system more cost-effective and efficient for developing, maintaining and supporting multiuser applications. Call Pick Systems for the story the LAN people won't tell you until you turn grey before your time.

PICK® PC SYSTEMS

Pick Systems, 1691 Browning, Irvine, CA 92714 (714) 261-7425

Pick System is a registered trademark of Pick Systems Inc.

prescient design achievements. From IDC's perspective, the four most important of these are:

- The Pick data model
- The correlative database
- The data dictionary concept
- The Pick file system

Each of these building blocks is critical to the timeless viability of the Pick design. They enable Pick users to have capabilities today that the trade press "predicts" will be on the horizon tomorrow. They all underlie Pick's philosophy that the goal of the information system is to readily provide information. It is clear that the Pick environment was designed with that as its highest priority.

The Data Model

The Pick data model is one of the most elegant characteristics of the entire design. As is evident from the Pick data model chart, it is designed to avoid the issue of the single purpose "fields and values" that is common in so many other products. Within a Pick file there are items, values and attributes. The beauty of the system lies in the fact that values can be items, and attributes can also be files. This leads to a truly relational environment where the view of the information can be tilted to whatever axis of entry specific users may have.

In addition, the presentation of the information is done in a layered fashion allowing users to see levels of information. As can be seen from the Pick layering effect chart, in this environment, a query can start at one level and then proceed through the data to greater levels of specificity. As the chart shows, the presentation of the information lends itself to a logical understanding by users of the relationships as they navigate through the data. This is done based on their own logic, not a programmer's.

This ability to go up and down through the base of information without worrying about how the DBMS software has to handle fields, records, files and strings constitutes a powerful query and information retrieval model. This is the basis of the "correlative" concept. IDC has found that this concept's flexibility in letting users structure what they perceive to be elemental relationships is very beneficial and productive.

The Correlative Database

This second design aspect is best described by a term that is unique to the Pick environment, correlative. It describes a fundamentally different approach to applications and queries from that taken by relational systems, and has significant merit. The correlative is essentially a comprehensive way to report on information in the database without the need for understanding specific relationships and dependencies of data. This is accomplished via the rules and paradigms that are inherent in the master data dictionary of all Pick systems.

An additional difference between the relational and correlative query is the bidirectional capability that is found in the Pick correlatives. In the majority of competing databases the relationships and queries are typically handled in a unidirectional fashion. While it is possible to have two distinct pieces of data, fields or records relate in two directions, this is typically accomplished via a circular logic route, not a single path with two directions.

Pick's ability to do this transparently not only simplifies the process for users, it results in better efficiency. This capa-

What started out as a trickle with the first commercial port to Microdata in 1973 snowballed by the end of the decade. Now, Pick has established a working relationship with both AT&T and IBM through the formation of Pick subsidiaries, PickTel and PickBlue.

bility makes the correlative an extremely powerful vehicle for query and report generation.

As will be evident in the next section, the presence of the master dictionary and its rule set mitigates the "correct-query-syntax/incorrect-results" phenomenon that occurs in other environments.

The Data Dictionary

One of the vogue concepts among the information system cognoscenti is "global data dictionary". It describes an environment where all information contained within a given system is listed, along with necessary conditions, in a master data dictionary. Many large IBM users pursue the realization of this concept today as if it were the Holy Grail.

Here again is where the initial GIRLS specification, which provided the foundation of the data dictionary, proves its timelessness. In this dictionary, every file and attribute is recorded along with key relative information.

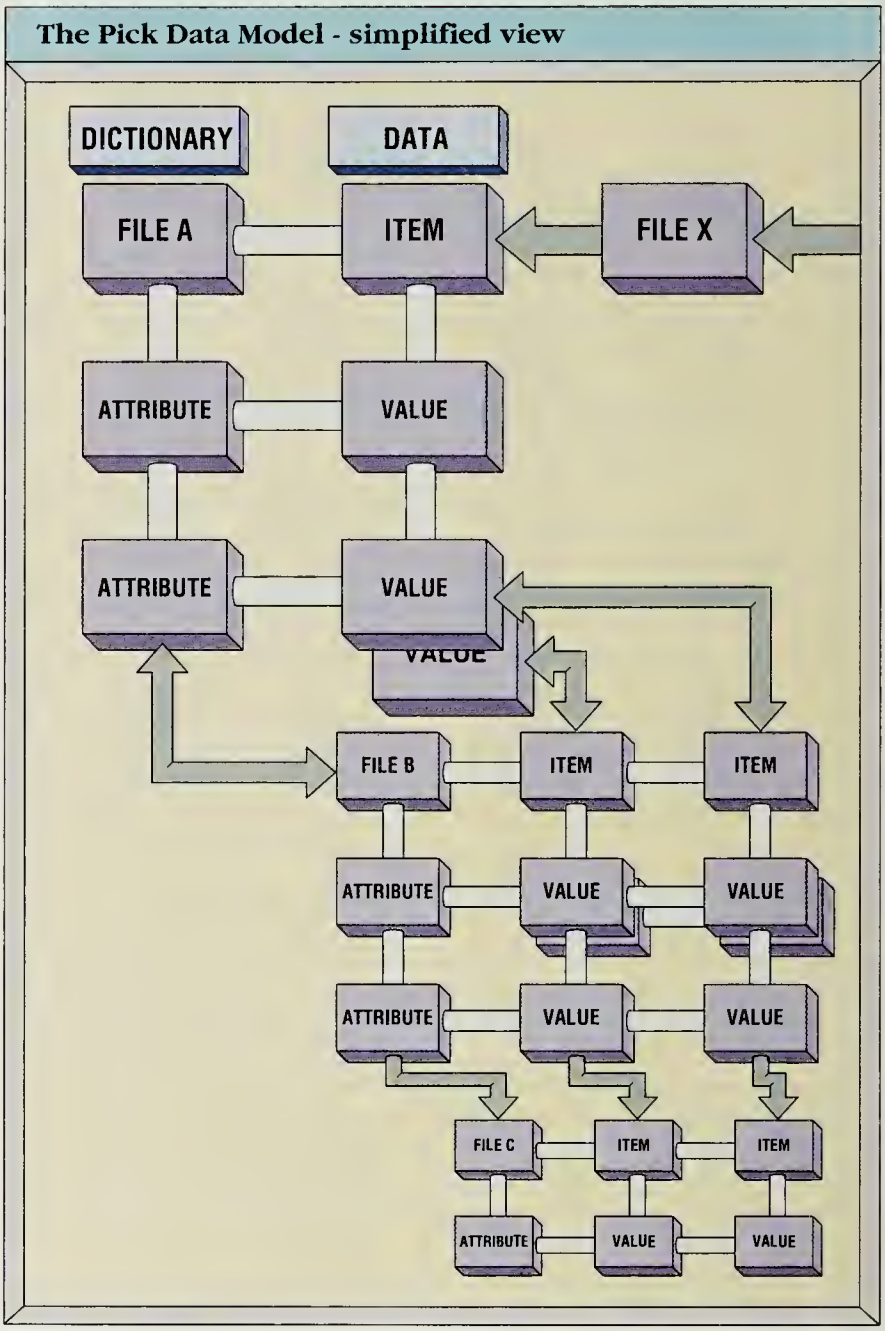
Invoked upon logon, the data dictionary allows Pick reports and queries to be organized simply. The availability and location of information is made comprehensible to users who are no longer required to become experts in data structures.

The ability to move beyond the issue of finding information and into using it is essential not only to Pick users. For instance, one of the key tenets of IBM's Systems Application Architecture strategy is the eventual development of a comprehensive data dictionary. It will be a triumph for IBM if it can replicate the ease of use achieved by Pick.

In the design of the Pick file system, the dictionary is the interface between the user and the data files. This relationship manifests itself in the processing speed and organization found in Pick application systems.

THE PICK FILE SYSTEM

The Pick DBMS is comprised of four key elements: The system level, the account level, the dictionary level and the data file level. A discussion of each follows.



The beauty of the Pick Data Model lies in its relational characteristics which provide users with a flexible view of data.

The System Level

The system level handles many of the system's administrative duties. Every time there is an end-user request, it is called to determine if the inquiry is valid in light of the privileges allowed to that account. The system level operates in conjunction with the next level, the account level.

The Account Level

The account level's main function is to record and provide to the system level the details about each valid user account. The information maintained includes file restrictions, allowed access methods, security information and the number or type of commands that are permitted by that particular user account. The centralization of these tasks and their inherent function within the overall system increase the ease of security and account/user control.

The Dictionary Level

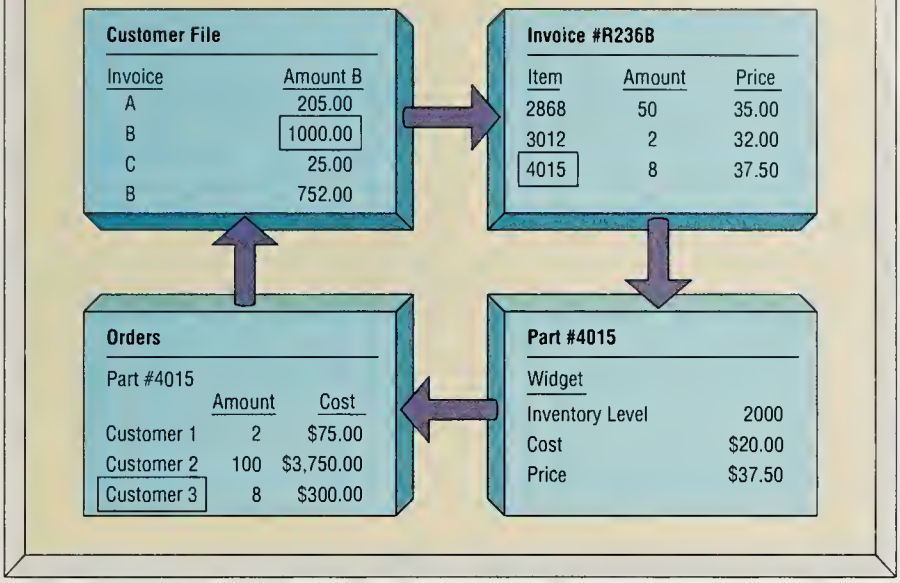
The dictionary level is described thoroughly in the preceding section. It is important to remember that this level is the actual point at which the user interfaces with the system.

The Data File Level

The data file level in the Pick environment is not notably different from many other DBMS systems in which files comprise the lowest level..

It is significant that within this four-part structure there is a dependent relationship between the four elements. This integration simplifies system use. There is, however, one caveat to consider. Pick does not presently allow for the substitution of third-party products to replace any of the four levels described here. This can be a problem for users who wish to use a PC front end or a different query tool.

The Pick layering effect



The Pick environment is designed to let users gain access logically and without programmer intervention.

THE PICK ENVIRONMENT TODAY

As would be expected from any 25-year-old product, there have been a number of changes to the initial Pick implementation. These key changes are:

- The movement to industry-standard operating systems, especially UNIX and MD-DOS
- Pick's movement away from being an operating system vendor to becoming a DBMS and applications supplier
- Advanced Pick and the introduction of system-wide automatic, ad hoc updating.

Movement to Industry-Standard Operating Systems

For years, the press and analysts chronicled the competition between Pick and UNIX as warfare. In that war, the goal was to conquer the minicomputer market. Pick was armed with its applications and commercial appeal, while UNIX fired back with its availability and the C language. Now the battles are largely over and the two combatants are realizing a peace dividend in the postwar years. Some Pick licensees will continue to use the entire Pick operating system and database, but it is no longer necessary.

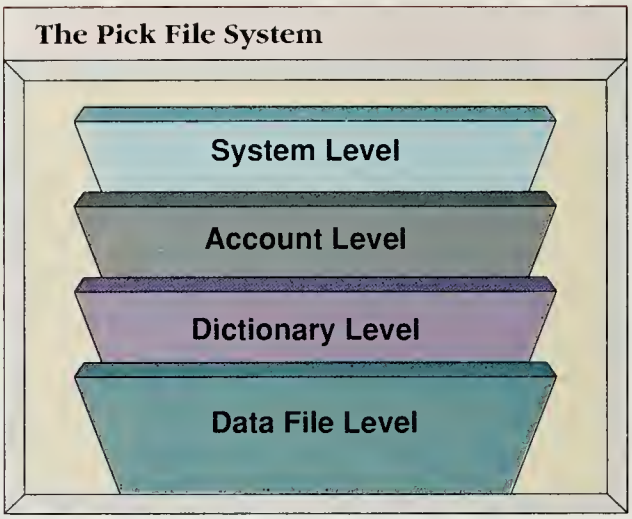
This is because the Pick database and its applications are now portable to UNIX and other industry-standard operating systems. While UNIX integration is the primary thrust today, IDC believes MS-DOS and OS/2 will also be targeted.

Implementing Pick on UNIX is a straightforward procedure. Seemlessly combined, they are two highly complementary products, with each having strengths that counter the other's weaknesses. Most notably, Pick has a strong application base and is easy to use, while UNIX has strong communi-

cation capabilities and development tools.

Pick's application base of over 3,000 products is composed of both vertical-industry and generic offerings, with vertical-industry comprising the vast majority. On the vertical-industry side, there are products such as ACT II, a mail-order house software product from Rigden, Inc., Cacos, a cargo control system from CRS Systems and Distributors INFO FLO, a wholesale distribution package from Interactive, Inc.

Generic products include CompuSheet+, a spreadsheet product from Via Systems, Inc., The Works, a word processing program from Jet Software, Inc. and Accu/PlotII, a graphics product from AccuSoft Enterprises.



The Pick file system appears to be hierarchical, but the Pick dictionaries (data which describes data, or meta data) make it global.

Pick and MS-DOS

The benefits to MS-DOS can be be extensive for smaller companies or workgroups that want more function than they can get from today's rudimentary DOS software, but lack the financial resources to acquire that function.

The Pick DBMS combined with MS-DOS on PCs provides a migration path for many smaller firms or workgroups in larger companies that are at the difficult stage of outgrowing their current PC systems.

Adding DBMS and Applications to the Operating Systems Mix

The biggest misconception regarding Pick is that it is only an operating system. Even though this statement was valid in the past, it is no longer true as Pick moves into the '90s.

Just as it is a misconception to think of Pick as only an operating system, it is an underestimation to ignore Pick as the foundation for its 3,000-plus database applications that are built, debugged, tested and maintained.

Database technology is not new to Pick. The initial goal of the product design was to build the "Data Management System." However, the technology of the time required that an operating system component also be built in order to deliver a fully functioning system.

Times have changed dramatically. The effects of integrating Pick with industry-standard operating systems like UNIX, MS-DOS and OS/2 eliminate many objections to Pick as a database, and elevate the Pick environment to a more competitive position. Of course UNIX and MS-DOS have also benefited from their newfound Pick compatibility.

IDC believes that many new customers will be attracted to Pick's appealing database and application features. Large companies may spearhead this movement. One of their biggest challenges is providing server-level implementations of data sets for ad hoc query and reporting functions. While UNIX is clearly becoming more capable in that area, its coupling with a truly end-user-oriented tool such as the Pick DBMS will solve many application problems that would otherwise go unresolved.

Advanced Pick

The ongoing development of Pick has lead to a number of enhanced versions. Despite this evolution, however, the environment's first monumental change is embodied in Advanced Pick. This change can be divided into three areas:

- Improvements in the actual system
- Improvements for programmers and developers
- Improvements for end users.

The improvements in Advanced Pick at the system level include transaction logging, secondary indexing and B-Tree capabilities. The goal in these changes is to add features for some of the more demanding environments, as well as to improve Pick performance in on-line transaction processing applications.

Improvements for programmers come primarily in the form of tools to improve the efficiency of the development effort and to reduce program code size. The most important of these, in IDC's opinion, is the ability to update data across the critical master dictionary without programming. Another important advance is the inclusion of an input/output processor to eliminate the need to write long system function calls.

For end users, the benefits are most easily seen in the browsing of data.

Advanced Pick allows users to step or browse through data via whatever route strikes their fancy. In addition, font and proportional spacing support have been added, allowing Pick systems to incorporate some of the desktop processing features desirable to end users.

PICK IN THE '90S

Calling Pick an industry classic is eminently justifiable. But how long can it maintain this lofty status in an industry that thrives on change? IDC believes there will be an increasingly important role for Pick. Some database technologists may disagree, but the need for information access and usability by the more than 50 million regular computer users in the U.S. is a strong force.

In order to fairly consider how Pick Systems and the Pick environment might look five or six years from now, IDC believes that a "Weaknesses, Opportunities, Threats and Strengths Analysis" is in order.

PICK WEAKNESSES

The weaknesses of the Pick environment fall into two disparate categories: the inherent weaknesses of the system and the lack of publicity leading to misconceptions about the company. They are by no means fatal; in fact, the Pick environment could continue successfully and even grow in it's present state. Nonetheless, there are these problems to consider:

Lack of Fortune 1000 Impact

The Pick environment has been a success in the small-business segment of the market that, unfortunately, draws little attention. Despite the size, growth and utility of small-business solutions, they are generally ignored by many high-powered movers and shakers. Pick has to improve its image and impact in larger sites. One way to do this is by aligning itself with UNIX.

Lack of Communication Capabilities

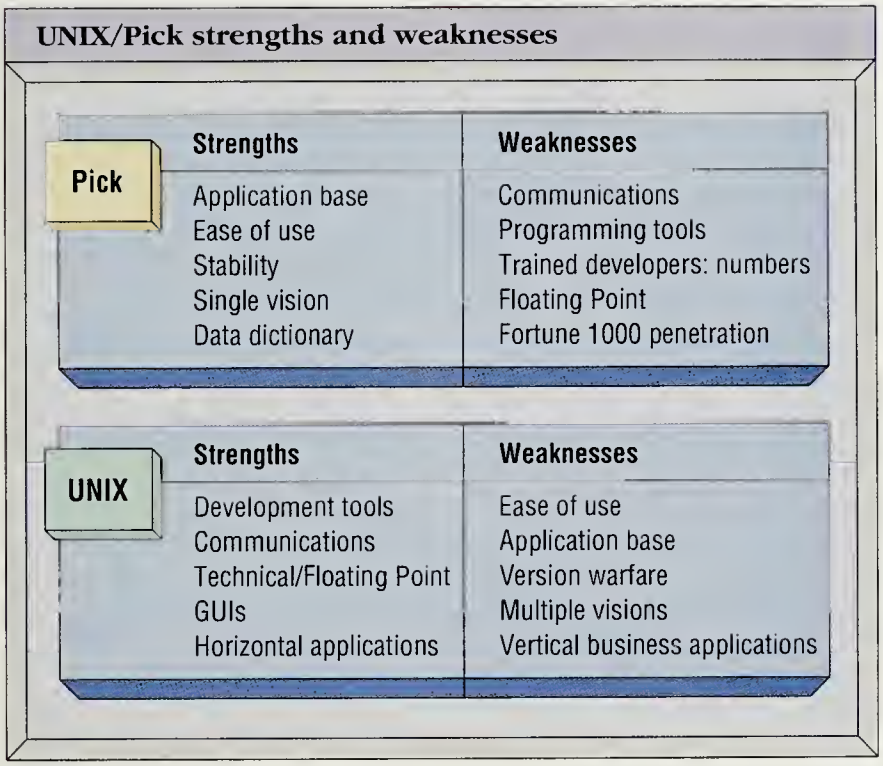
The issue that was not foreseen in the initial design of Pick was communication. Pick is inherently a standalone system. The addition of UNIX partially mitigates this problem, but how Pick will integrate into a truly distributed DBMS environment is still a looming question. Again, its newfound affiliation with UNIX may help.

Limited Programming Tools

Despite the large amount of function provided in the Pick development environment today, there is still room for more. With the rest of the world moving toward C, Pick must add to its own Basic programming language offering. Also, there may be some issues at the graphic user interface (GUI) level. Pick does presently support GUI, but the inclusion of Native X or Windows/PM calls might be required in the future. The addition of Advanced Program-to-Program Capabilities would help.

Poor Performance in Floating Point

While it is certainly no secret that the Pick environment was designed to deal with textual or string-related business data processing, the pressure for expanded quantitative, computational facilities is being felt. IDC's user surveys have found that the performance issue is not going away. The pressure may get turned up even more by the



Once rivals, UNIX and Pick now complement each other, a development that bodes well for Pick's commercial fortunes.

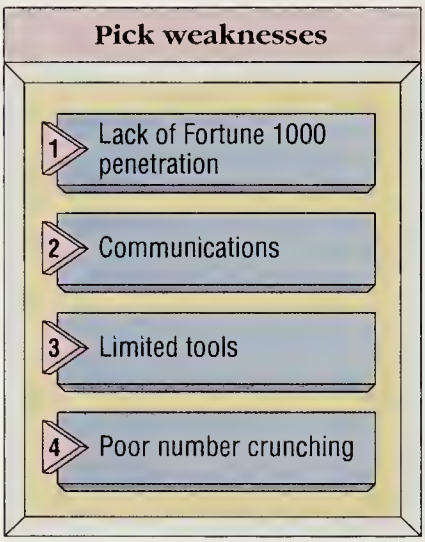
inclusion of more complex budget and numerical calculations as new business applications strain the present Pick system.

PICK OPPORTUNITIES

The movement to UNIX and the break with some of the historical emphasis on Pick being only an operating system have positioned Pick in a strong marketing position. While the firm is not cultivating "unplowed fields" untrodden by the competition, IDC believes there are still substantial opportunities. They include:

Small Business Upgrades

Although the small business segment of the market has its drawbacks, it also has its advantages. The trade press and analysts may think there is no market outside the Fortune 1000, but IDC has found that the small business market is comparable in size to its Fortune 1000 counterpart. IDC estimates that as many as 750,000 of these small establishments are outgrowing their standalone PC systems. Pick is very well positioned to make major sales gains in this segment.



While Pick's lack of visibility among Fortune 1000 companies is countered by a strong presence among smaller firms, its lack of communication capabilities makes it reliant on systems such as UNIX and MS-DOS.

The UNIX Business Database

Although there are a number of UNIX database products that are selling very well, all of them tend to be high-end products with limited application catalogs. The Pick system is a very different product from those of Oracle, Ingres, or Informix. For those customers who are more business- than technology-oriented, Pick is likely to have a strong appeal.

PickBlue and PickTel

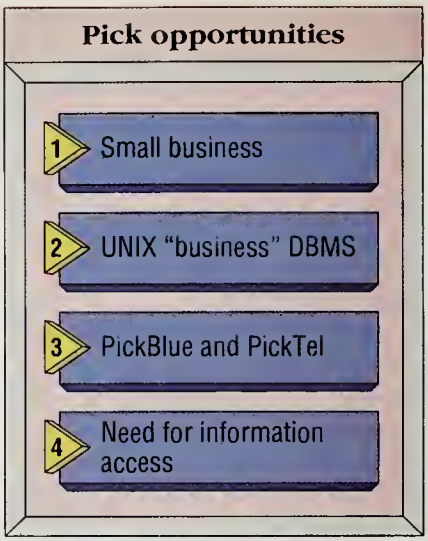
These two Pick subsidiaries are charged, respectively, with optimizing Pick's presence with IBM and AT&T. These alliances are structured in a manner to more effectively generate business than engineering exchanges. The IBM RS 6000 implementation, in particular, appears to give Pick a broad market, with little in the way of established competition.

Increasing Customer Attention to Information Access

The Pick environment clearly provides access to information contained in the database with minimal programming and maximum organization. Microsoft's big thrust, its "Information at your fingertips" concept, is similar. As actual applications that require user access to information grow, Pick has a large opportunity to play an important role.

THREATS TO PICK

As with any other player in the information industry, Pick is subject to menace from within and without. The threats it should be most immediately concerned with include:



Pick is betting its future on links to small businesses, UNIX, IBM, AT&T, and the need for user-friendly information access.

Limited Marketing

In an industry where making the loudest possible noise has become a key selling requirement, Pick clearly is not shouting. It does not help that the word "Pick" does not show up in many of the licensees' marketing materials. The decision by more aggressive companies to bury Pick under a ton of marketing fodder is clearly a concern. Pick must respond by aggressively promoting its existence and its quality. This means spending money.

Slow UNIX Acceptance

Pick's increasing reliance on the UNIX connection closely ties its fortunes to those of UNIX. If UNIX stumbles in its march toward universal acceptance, Pick will also feel the pain. IDC expects that Pick license sales will continue to grow based on Pick as a standalone entity, but the largest long-term growth will come if UNIX succeeds. What can Pick do to help ensure that success? Unfortunately, very little. However, it has

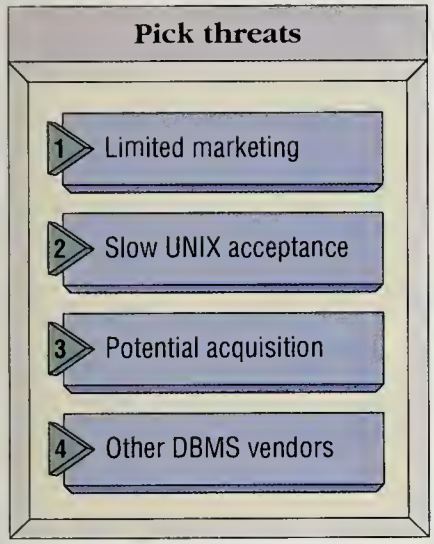
joined UNIX International and that can only help.

Acquisition of Pick

With revenues of around $25 million annually,the privately-held Pick is not attractive to would-be suitors based on its financial prospects. However, if the company were bought – and it is definitely not for sale – the delicate formula that has guided it since its inception could be irretrievably altered for the worse. Of course, a well-managed acquisition could also be a great benefit.

The Large Database Suppliers

Clearly companies such as Oracle, Microsoft, Sybase, Ashton-Tate and even IBM have not yet considered Pick a threat to their sales or market share. If there were a change of mind and some of these powerful DBMS vendors attacked Pick in the marketplace, Pick could have serious problems—problems it has never before faced. It would be in a stronger position to ward off the behemoths if it increases its revenues.



Pick may suffer if it does not overcome its traditional disdain for self promotion. An acquisition could also change the company for the worse, as could increased competition from the large DBMS vendors.

PICK STRENGTHS

There are many things that are right with Pick, or the environment would not have grown and prospered for so long. These strengths are the key to continued future growth:

The Pick Design

The fundamental design, specified 25 years ago, is as appropriate today as it was in 1965. The concepts of information access and data dictionaries are the building blocks that other systems are just now trying to add.

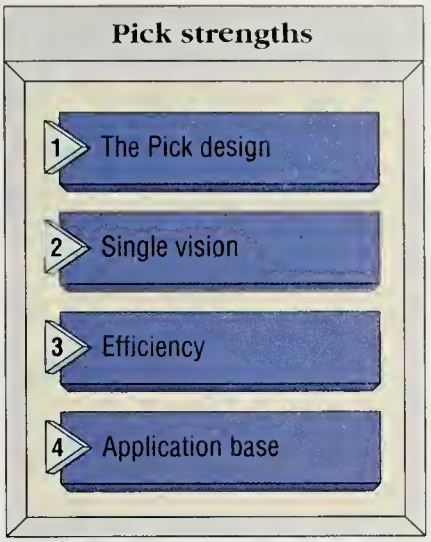
Single Vision

Time after time, IDC has seen that the most effective, efficient and timely designs are controlled and managed by either a single individual or a very small group. In the Pick case, it is accurate to say Advanced Pick represents 25 years of vision by Dick Pick. Because of his stewardship, the company maintains a clear goal and a definite direction. All these pieces add up to a competitive advantage.

System Efficiency

Somehow, the incredible efficiency of the Pick environment seems to be ignored. With OS/2 requiring 4M bytes of memory per user, Windows needing 2M bytes and Apple's Multifinder also consuming 2M bytes, it is amazing to see this elegant multi-user system supporting 65 on-line users with only 16M bytes. For smaller environments, Pick can run up to 10 users on a 640K byte, 286-based machine.

While little is made of the fact that Pick will run under configurations not seen since the late '70s, IDC believes customers who prefer to buy less hardware will be attracted to the Pick solution.



Pick relies on its prescient design to survive in today's competitive information industry environment.

Application Base

Even though many of the Pick applications are vertically oriented for smaller firms, there are others that are universally useful. It is important to realize most of these applications have been around long enough to be fully tested and debugged. IDC believes this is the kind of mature technology that users feel most comfortable with.

SUMMARY

In summary, the Pick environment is one of a handful of products that can be considered a classic in its design. Due to its many strengths, it is better positioned today than ever before. It is especially well positioned to take advantage of UNIX and other non-proprietary systems.

The fact that Pick is end-user oriented, and is designed to solve information needs outside the realm of programmers is its strongest edge. As the industry has become computer-rich and information-poor, the need for the Pick environment has grown exponentially.

A NEW MEANING TO THE TERM "DOUBLE STANDARD"

PICK and UNIX. The multi-user business management solution from Pick Systems.

This union of two industry standards, the PICK System and UNIX® System V, IBM's AIX or SCO UNIX 386, provides PICK users with all the connectivity and interoperability advantages of the UNIX system while providing UNIX users with access to over three thousand PICK multi-user business application solutions.

All without compromise.

So if your business depends on supplying your customers with a better business solution, perhaps you should look into doubling your standards and call Pick Systems at (800) 367-7425 for more information.

PICK®
SYSTEMS

1691 Browning, Irvine, CA 92714 (714) 261-7425

PICK System and PICK are registered trademarks of Pick Systems.
UNIX is a registered trademark of AT&T in the US and other countries.
AIX is a registered trademark of IBM. SCO UNIX 386 is a registered trademark of Santa Cruz Operation, Inc.

COMMENTARY

Norman Weizer

Waiting time for wireless

These days, it seems that every time we turn around, we hear or read something about a new wireless data communications technology that will revolutionize the world. Inside of a building, outside of a building, these new technologies are growing like crazy. It's easy to feel like we're missing a good bet if we don't jump right onto the bandwagon and get some form of wireless technology installed in our data networks.

But are we really missing a bet? What does this technology really bring to the party that good old copper wire, or good new optical fiber, doesn't provide? Let's sit back and take a hard look at some of these new technologies.

We have had wireless data communications systems for many years. Paging networks, two-way radio networks and special mobile radio networks are familiar (even too familiar) to many of us. These networks have been used for alerting, dispatching and status monitoring applications.

The networks are good for these applications but generally too costly and too slow to be practical for casual use by portable workstation users who need to pass significant amounts of information between their workstation and home base.

Continued on page 75

Options cloud cabling picture

ANALYSIS

BY JOANIE M. WEXLER
CW STAFF

In the "old" days of local-area networking, corporate cabling decisions were pretty straightforward. If you ran Ethernet, you installed coaxial cable. If you ran token-ring, you installed shielded twisted-pair. That is what the standards dictated.

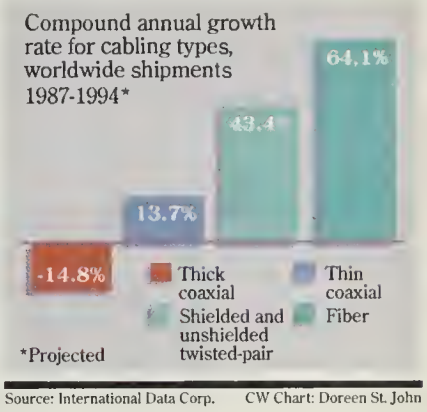
But now that savvy engineers have figured out how to make LANs operate reliably over a variety of media, vendor companies have presented users with a double-edged sword: a broader array of networking choices accompanied by the onus of new decision-making dilemmas.

"Many of our big clients are coming to us confused about whether they should pull fiber, twisted-pair or coax," remarked Todd Dagres, director of communications at The Yankee Group, a research and consulting firm in Boston. "It's an important decision, because when you consider per-user computing costs, cabling is right up there. And you can easily make a choice that is good for the short term but cramps your style later."

Cabling alternatives are running amok. Late last month, the 10Base-T standard that allows 10M bit/sec. Ethernet LANs to operate over unshielded twisted-pair was formally ratified. 10Base-T is unseating new installations of both thin coaxial cable and the more cumbersome thick coaxial cable — other standard media for Ethernet — as a cost-effective option (see chart).

Oh, what a tangled web . . .

The use of fiber-optic cabling is expected to show strong growth, while the demand for thick coaxial goes into the red



Source: International Data Corp. CW Chart: Doreen St. John

In the token-ring arena, it was only a year ago that Proteon, Inc. introduced a technology for running 16M bit/sec. LANs over unshielded twisted-pair wiring — a feat token-ring pioneer IBM insisted could not be done because of reliability problems with the medium.

FDDI lightning

Today, not only are there 16M bit/sec. token-rings cruising along over telephone wire, but there are also efforts under way for running the comparatively lightning-fast 100M bit/sec. speeds of Fiber Distributed Data Interface (FDDI) — which specifies glass fiber-optic cable — over the medium, as well as for running the high data rates over plastic fiber. Plastic fiber is a less expensive alternative to glass but poses some distance limitations and can lose transmitting power as it ages.

The controversial 100M bit/sec. media proposals will be presented this week at the American National Standards Institute FDDI committee meeting in Fort Lauderdale, Fla. Some industry pundits argue that FDDI alternatives can bring better performance to users less expensively. Others counter that there are too many trade-offs in using the substitute media and that implementing even more standards will fractionalize FDDI volume and keep prices elevated.

One user interested in high speeds over copper is Ray Parcell, computer systems specialist at the Naval Mine Warfare Engineering Activity in Yorktown,

Continued on page 78

Pitney-Bowes scores $30M pact with Ardis

BY MICHAEL FITZGERALD
CW STAFF

Pitney-Bowes, Inc. has agreed to a $30 million, five-year contract with Ardis, the IBM-Motorola, Inc. radio network joint venture.

Under the terms of the deal, Pitney-Bowes will outfit its field engineers with Ardis machines. Ardis will provide equipment, systems integration and communications software. The contract was approved by Pitney-Bowes' board of directors but has not been signed because the two companies are working out the final details, according to a source close to the negotiations.

The contract, which is a "fait accompli," according to Alan Reiter, executive editor of the "Mobile Data Report" in Washington, D.C., will be the largest confirmed contract Ardis has achieved other than its role as provider of systems to IBM.

United Parcel Service is the only other confirmed client of the joint venture, although several companies are developing or testing the Ardis system. In May, UPS signed an agreement to use Ardis technology, but UPS views Ardis as an interim solution while it develops its own 220-MHz network based on proprietary customized machines.

Pitney-Bowes systems officials did not return calls regarding the project, but there will be a representative speaking on Ardis technology at the Wireless Computing Conference on Oct. 28. Ardis officials had no comment on the deal.

Joseph Baylock, an analyst at Gartner Group, Inc. in Stamford, Conn., said the Pitney-Bowes contract would help validate the Ardis concept of radio-controlled communications technology.

Announcing the arrival of your favorite MVS text editor on OS/2!

SPF/2™

TRUE MAINFRAME COMPATIBILITY

SPF/2 offers true ISPF/PDF compatibility to the MVS and COBOL programmer.

SPF/2 is written specifically for OS/2 using virtual memory to handle very large files, multi-process technology for split screens, and an interface to IBM's REXX as a macro language.

MACRO INTERFACE TO REXX

SPF/2 includes 75 ISREDIT commands that interface with IBM's REXX. You may use these to write your own commands in REXX and, if you wish, assign them to the 48 programmable function keys.

Existing mainframe REXX edit macros may be downloaded to run with **SPF/2** and CLIST macros may be easily converted to REXX.

SPF/2 is compatible with OS/2 Standard and Extended Editions, Versions 1.2 or later. However, Standard Edition users will not have access to macro capabilities due to the unavailability of REXX in that environment.

3270 COMPATIBILITY

SPF/2 processes keystrokes in the same manner as the OS/2 Extended Edition 3270 Emulator, including NEW-LINE, ENTER and status display indicators.

FREE DEMONSTRATION DISKETTE

Prove it to yourself. Call our **toll-free, 24-hour Demo Request hot line at (800) 648-6700** for a free real-working-code demonstration disk.

MULTI-USER LICENSE

Special cost-effective Multi-User Licenses are available for purchase directly from CTC. For information, call our Multi-User License contract administrator at (800) 336-3320.

CTC®
1040 Marina Village Parkway
Alameda, CA 94501 (415) 521-5900
(800) 336-3320 FAX: (415) 521-0369

Netware users fight printer problems

BY JIM NASH
CW STAFF

For some information systems managers, Novell, Inc.'s print service has offered only three options: go slow, disappear and crash.

Several users of Novell's print service software who gathered at last month's Networld '90 show griped about a variety of problems with the print applications. The leader of a large Novell users group said he knows of "three or four" IS departments waiting for Novell to solve a number of print server problems.

The print server software sells as a Netware-loadable module (NLM) on a file server, as a Netware 286 value-added process application and as an executable application to create a dedicated DOS print server.

John Riffle, technical service representative for Martin Marietta's Information Systems Division in Orlando, Fla., said the NLM print service has proved unreliable in tandem with remote Digital Equipment Corp. postscript serial printers.

Riffle is one of several users complaining that the network print software has not been thoroughly tested. He said Martin Marietta's printing trouble began last February when he upgraded some Netware 386 packages from Version 3.0 to Version 3.1, which contained Version 1.0 of the NLM print services.

"We tried to bring up 16 postscript serial printers attached to different personal computers using Novell's remote print Netware-loadable module [Version 1.0], but the printers were getting knocked completely off-line."

Although he has yet to determine if it is related, Riffle said there have also been instances when rebooting a local PC attached to a printer has caused the file server to crash.

Martin Marietta technician Jim Pelletier said printing jobs queued on a local printer are sometimes deleted when another job is sent from the local PC.

"There are at least two other sites at Martin Marietta" having similar headaches, Riffle said. Users report no problems if printers are hung off a file server or if parallel Hewlett-Packard Co. printers are substituted for the serial printers, he said.

Other users had almost the opposite experience. Users at Lockheed Corp. subsidiary Lockheed Sanders, Inc. in Nashua, N.H., reported that the print service on Version 3.0 was "pretty unstable," according to Lockheed Sanders networking strategist Glenn Fund. Fund said the print service periodically would run very slowly or lock up file servers. His answer was to upgrade, and he said the network has yet to lock up since installing Netware Version 3.1.

Riffle's first attempted solution to the printing problems was a full retreat. He said he tried to downgrade to Version 3.0 but found that Version 3.1 overwrites the previous operating system, stranding him at Version 3.1. The predicament was partially solved only when he ran Novell's print service as an executable program on a dedicated print server.

A Novell spokesman acknowledged "some problems" with Version 1.0 of the NLM print service occurring a year ago but attributed them to configuration mistakes by users. The Provo, Utah-based company also acknowledged errors with its Pserver value-added process application, which caused system crashes in Netware Version 2.15C. Novell has recommended that users reconfigure the value-added process as an executable file.

Version 1.2 of the print service, which is currently available, addresses NLM problems, according to the spokesman. Pelletier said he disagrees. He said he talked with Novell technicians and was told that they had never tested NLM print services with DEC's LN03 postscript serial printer.

"We were told by Novell engineers that the printer problem is one of their top 10 problems to solve," he said.

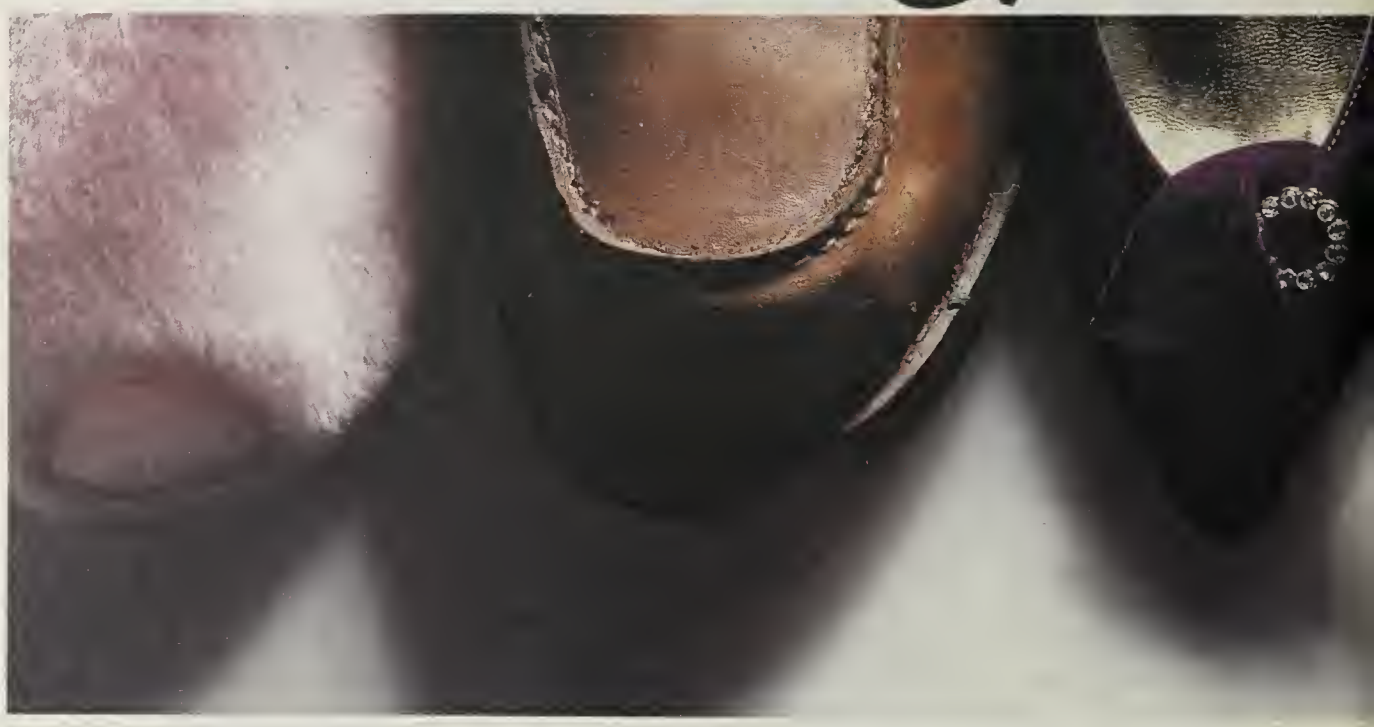
NEW DEALS

GEIS inks banking pact

General Electric Information Services said that Chemical Bank in New York has purchased its BPS*Central System, a mainframe software system that reportedly will allow the bank to process electronic payments for clients who are implementing electronic data interchange with their trading partners.

GTE Spacenet Corp. has inked a $5.7 million contract with Silo, Inc., a consumer electronics retailer, for a nationwide data communications network consisting of very small-aperture terminals installed at Silo's 215 stores. The vendor will also reportedly provide operations and maintenance support.

Technology for



Now, bankers, nuclear physicists, athletes, students and scores more can walk right into a virtual shopping mall of information. How? The answer is an exciting new on-line gateway service called NYNEX INFO-LOOK®, developed by our Science & Technology Center.

To enter, all you need is a computer, modem, and a calling card from New England or New York Telephone. It's that simple because we designed special software that allows your computer to interact directly with the database that holds the verification and billing information. So instead of waiting days to receive confirmation and a password by mail, you now have only to wait milliseconds.

Weizer

CONTINUED FROM PAGE 73

However, a new breed of networks target the above type of communication, including the IBM-Motorola Ardis and the Mobitex network from RAM Mobile Data, Inc.

In addition, cellular telephone networks are increasingly carrying facsimile and data communications. Motorola is even proposing a new data network that will be supported by a fleet of satellites for around-the-world coverage.

Companies are already bringing out such devices as battery-powered fax models, which can operate in an automobile, and battery-powered mobile modems that are designed to work with cellular networks.

The cellular networks bring flexibility in the connection of portable PCs and fax machines to corporate computing resources. A cellular phone system allows you to drive your car and communicate using your PC and your fax machine at the same time.

The new data networks such as Ardis and the Mobitex network promise reliable data communications even when the terminal is in a relatively well-shielded building.

They also feature a nationwide computer communications network that allows them to deliver information to a terminal in just about any major population center in the U.S.

All of this sounds great. The vendors are predicting markets for this type of mobile data system in the range of $1 billion to $2 billion dollars per year during the next three to five years. Almost daily, equipment suppliers are bringing out new mobile faxes and special modems that can operate over mobile networks.

But is there a fly in this mobile ointment? Actually, there are two flies. They are called the speed (bandwidth) fly and the standards fly, and they sometimes cooperate to muck up the works.

Mobile telephone and radio communications are more difficult than plain old telephone service communications, in which a signal doesn't fade like a mobile signal can. Telephone systems don't have to handle instantaneous handoff of signals from one transmitter to another like a mobile system does. Mobile systems also have their own methods of multiplexing and compressing signals.

What does that mean to you? First you can't just take my old modem, tie it to a battery and expect to use it in a mobile application. It takes a special modem using a special protocol. Plus, you need another identical modem at the fixed end of the wire to undo what the special mobile modem did.

Now standards get into the act. No one has developed a standard for this special protocol. Therefore, all of the interested modem manufacturers are going their own way, and nobody understands anybody else.

And, just to make life interesting, the cellular network operators are in the process of switching from analog to digital networks to fit more users into the system. For reasons that are too esoteric to go into here, the new digital networks will be less adapted to data communications than the current analog networks are.

The new digital communications networks like Ardis and Mobitex don't run into the standards problem; they control their own standards.

However, they run into speed problems. Our communications experts say that the maximum effective throughput on these networks is only about 600 bit/sec. once error correction and overhead bits have been taken care of. That's only one quarter of what your 2,400 bit/sec. modem can provide and one-sixteenth of what your fax can do when it's going full tilt.

So what do you do? I suggest that unless you have some real business needs, which you can justify on a hard-dollar payback basis, sit on the sidelines and watch the fun for a while. The problems will be ironed out eventually. In the meantime, the donnybrook will be fun to watch.

Weizer is a senior consultant at Arthur D. Little, Inc. in Cambridge, Mass.

all walks of life.

The software is so successful, we're now offering it to other telephone companies for their gateway services.

The NYNEX® family of companies can offer you everything from network services and software to computers and systems integration. So call us at 1 800 535-1535.

It's a step in the right direction.

Need to communicate? Need to compute? The answer is

NYNEX®

GLOBAL BITS

Networking East Germany

General Electric Information Services (GEIS) has installed a network node in East Berlin and plans to install network nodes in three other cities in Eastern Germany before the end of 1990. The nodes will allow users to gain access to GEIS' value-added network services, such as eletronic mail and electronic data interchange, via a local telephone call.

Newbridge Networks, Inc. has completed the installation of an international network for **Towers, Perrin, Forster & Crosby, Inc.** The network supports communications among the New York-based international consulting firm's remote branches and from overseas sites to the corporate data center in Philadelphia.

Sprint International has signed an agreement with **CPRM,** the international telecommunications operating entity in Portugal, to explore joint provision of services between Portugal, North and South America and Africa. The two firms will also discuss installing a trans-Atlantic fiber-optic submarine cable.

Welcome To The Wide Open Spaces Of Progress.

PROGRESS®

Welcome to a 4GL/RDBMS world that lets you decide how to build and run an unlimited range of applications without the usual limits. Without the usual constraints.

Take a seat and let us explain.

To begin with, the PROGRESS 4GL lets you build with incredible efficiency while giving you the control of a full-structured programming language.

When the name of the game is development speed, you've got it. When the name of the game is control, you've got it. When the project calls for both, you've got both.

And just to make sure you like the view, you've also got a menu-driven application builder, ANSI-standard SQL and 3GL access if you want it. You've got a true distributed RDBMS with client/server architecture and two-phase commit. You've got multi-threaded, scalable performance on large multi-processor systems.

But stay seated, there's more.

PROGRESS ties together data across different operating systems, networks and databases. It lets you port applications without modification across UNIX, VAX/VMS, OS/2, DOS (even 640k PCs) and CTOS/BTOS with AS/400 coming soon. PROGRESS applications run unchanged over distributed networks using TCP/IP, DECnet, NetBIOS and SPX/IPX. They even update Oracle, Rdb, RMS and PROGRESS databases simultaneously.

What it all adds up to is 40,000 installations in 30 countries covering every conceivable application. Plus the #1 rating for efficiency, reliability, and overall user satisfaction in Datapro's last three surveys.

So find a phone and call **800 FAST 4GL** to find out about the PROGRESS Test Drive and the full Datapro report on PROGRESS.

Once you step into our world, you'll never want to leave.

Progress Software Corporation
5 Oak Park, Bedford, MA 01730
Telephone 617 275-4500
Fax 617 275-4595

PROGRESS is a registered trademark of Progress Software Corporation.
Datapro, UNIX, VAX/VMS, OS/2, DOS, CTOS/BTOS, AS/400, TCP/IP, DECnet, NetBIOS, SPX/IPX, Oracle, Rdb, and RMS are registered trademarks of their respective manufacturers.

T h e U s u a l L i m i t s D o n ' t A p p l y.™

E-mail spurs new privacy debate

BY JIM NASH
CW STAFF

Information systems managers have found themselves in the middle of a renewed debate: Do employees have any right to privacy at their desks?

Increasingly, network administrators must help corporations ride the fence between legitimate employee oversight and intimidating scrutiny. Whereas in the past, companies argued desk and telephone privacy rights, the new focus is on electronic mail.

"It's ludicrous to separate E-mail [privacy] from the desk and the file cabinets," said Mike Cavanagh, executive director of the Electronic Mail Association in Arlington, Va. It is the same issue, Cavanagh said, just updated.

In the glare of a class-action lawsuit filed this summer against Epson America, Inc. alleging wholesale interception of employees' E-mail, companies are taking a new look at privacy. Resulting draft policies highlight ambivalent feelings about workplace privacy.

The Epson case illustrates how differently management and labor view privacy. Alana Shoars, former E-mail coordinator at the Torrance, Calif.-based company, has alleged that her supervisor was printing reams of E-mail without employees' knowledge. Shoars has charged that she was fired Jan. 25 for questioning the appropriateness of E-mail taps. She is part of the class-action suit.

A spokesman for Epson has said that the firm dismissed Shoars for "gross misconduct and insubordination" [CW, Aug. 13]. Epson denied wide-scale interception but later stated that it "could not guarantee the privacy of documents and messages" stored anywhere in the company.

That statement puts Epson among the majority of companies, according to Cavanagh, that have formally stated that privacy rights take a back seat to the corporate duty to run a successful business.

Ken Rogers

Shoars *challenged Epson's privacy policy*

Pacific Bell in San Francisco has a similar privacy policy, defining E-mail as "the property of the company and to be used for business use only, unless prior permission is given from a supervisor."

Warner Brothers, the film and video division of Time Warner, Inc., has taken a stronger privacy stance. The Burbank, Calif.-based company hired Shoars as E-mail coordinator in August, about seven months after Epson fired her.

Bill Cotter, director of international data processing and domestic office systems at Warner, said Shoars' name came up in a discussion about E-mail privacy among IS managers. Cotter said he interviewed her and found "that she had the interconnectivity and E-mail experience that is absolutely necessary for this job." Also, he explained, her privacy philosophy matched Warner's.

Two months later, he said, he is impressed with her work in implementing Warner's strict E-mail policy: "If it's not addressed to you, it's not yours."

No random checks

Employees are told not to conduct personal business on company time or equipment, but no random checks by IS — for compliance or systems maintenance — are allowed, Cotter said: "If you don't have people's confidence, what's the purpose of having an IS department?" He added that employees need to feel their system is free of excessive scrutiny before using it fully.

Epson and Warner "are at the extremes of a bell-shaped curve," said Walter Ulrich, an analyst who follows E-mail issues for consulting firm Arthur D. Little, Inc. "Most companies' [privacy] policies are de facto, not written, but most executives won't go on routine electronic fishing expeditions," he said.

Steve York, a member of the Aerospace Industry Association's E-mail committee, said the matter has made for hot debates lately. York is also manager of information exchange technologies for Hughes Aircraft Co.

He said Hughes is in the process of writing a privacy policy, one built at least partly on the committee's findings. York said that reading portions of some messages is unavoidable with Hughes' 25,000-employee, multivendor environment. However, aside from troubleshooting, he said, messages are confidential.

Stanford explores 45M bit/sec. net standard

ON SITE

BY ELISABETH HORWITT
CW STAFF

PALO ALTO, Calif. — While most users are letting the networking industry decide which high-speed networking protocols will be widely used this decade, Stanford University has already begun evaluating Switched Multimegabit Data Service (SMDS) as a possible way for its researchers, academics and scientists to collaborate over distance at 45M bit/sec.

Stanford began installing SMDS nodes on campus last summer. Last week, it participated with Pacific Bell in an SMDS demonstration at Interop '90 in San Jose, Calif. Also, on Nov. 15, the university and Pacific Bell will initiate a six-month commercial trial of an SMDS network that will handle such bandwidth-hungry applications as transfer of medical images and earth resources mapping.

If the California Public Utilities Commission approves, the trial will extend beyond Stanford to "the outside world," including the U.S. Geological Survey and a hospital, said Frank Liu, a technical staff member at Pacific Bell.

In addition, Stanford plans to communicate over SMDS links with other members of the Bay Area Regional Research Network (Barrnet).

Stanford's Yundt *sees need for 45M bit/sec.*

"We are in the learning stage at this juncture," said Wiliam Yundt, the university's director of network and communications systems.

"We have a reasonable understanding of the pros," such as being able to share high-speed line costs with other users, he said. "We see a need for those speeds in the near term."

In an SMDS network, a central office is the hub of a multisite, and often multiorganization, network. As with a packet-switched network, customer premises equipment packetizes data and equips each packet with an address so that the carrier can route it to the right destination. Unlike packet switching, however, SMDS networks can handle up to 45M bit/sec. and share the same carrier fiber-optic lines and equipment as voice and other types of transmissions, Liu said.

An SMDS network allows multiple customers to share the cost of high-speed connections and pay according to use.

For 1.5M bit/sec. T1 connections, customers can use ordinary copper wiring to the closest carrier site; however, a fiber link will be needed to customer premises that want the higher 45M bit/sec. T3 speeds.

High-speed users

SMDS networks target users who need to communicate in intense, high-speed bursts with a large number of geographically distributed sites. Sites that communicate regularly over high-speed lines can use the traditional point-to-point T1 or T3 connection, Yundt pointed out.

Doctors who want to access records and images, such as CAT scans, from a number of local hospitals would be one type of user that could benefit from SMDS, Liu said.

The technology also puts control of the network in the carrier's hands, which is an advantage to organizations that do not want to own and manage their own networks, Liu said.

In the initial stage of the pilot, which begins next month, Stanford researchers will access multimegabit medical images from computers at the university's medical center, Yundt said. Because it is hard to ensure that files that large arrive intact across a shared, switched network, the university is evaluating the SMDS capability of "segregating" bandwidth on the network, Yundt said. This would potentially guarantee reliable delivery over a path that is separate from the rest of the "shared network," he added.

While the initial pilot will use 1.5M bit/sec. SMDS links, Stanford is more interested in the 45M bit/sec. version, which will be pilot-tested by the university beginning next year, Yundt said. "We already have an extensive network of T1 links," he explained.

Pacific Bell and other regional carriers hope to introduce SMDS in late 1991 to 1992, Liu said.

SMDS was initially conceived as a metropolitan-area networking protocol, but the local carriers now hope to extend its reach nationwide with the help of long-distance carriers, Liu said.

Cabling

FROM PAGE 73

Va. "High-speed twisted-pair is coming into our future because I'm buying 18 workstations," he said. "The only way I have to get at them is to run an extension to my backbone [thick coaxial] or use my existing twisted-pair."

Adding to the tangle of cabling choices are emerging advances in wireless LAN technology, such as NCR Corp.'s announcement last month of a $1,390 wireless LAN interface card for Novell, Inc. Netware networks.

The pot of cabling spaghetti can be boiled down, at least to one general rule of thumb, according to cabling analysts: When in doubt, install fiber in the backbone and twisted-pair to the desktop. Fiber has bandwidth potential into the gigabytes as well as complete immunity to electromagnetic interference, making it the most reliable medium available. Unshielded twisted-pair is already installed to most desktops.

Tom Nolle, president of CIMI Corp., a consulting firm in Voorhees, N.J., pointed out that "coax and fiber can't run through existing telephone channels. My personal feeling is that you run unshielded twisted-pair wherever you have individual workstations operating at 16M bit/sec. speeds or under. Wherever you're not running that, you run fiber."

"We're using fiber in our backbone, but not to our workstations yet," said Jack Sprague, consulting systems analyst at Frito-Lay, Inc. (see related story next page). Frito-Lay is running IBM's Type 2 cabling — which contains a pair of shielded twisted-pair and a pair of unshielded twisted-pair — to its individual desktop computers.

Smith, Kline, Beecham Consumer Brands in Pittsburgh invested $500,000 in IBM Type 2 cabling four years ago "when the fiber option was not yet available," said Richard Podgurski, director of information services. "We've considered fiber, but the investment in IBM's cabling scheme is already there."

Nolle commented, "Any company pulling cable today that doesn't anticipate a need for fiber in the future is making a mistake that it will pay dearly for someday."

NEW PRODUCTS

The following is a summary of some of the products announced at the Telecommunications Association convention in San Diego last month:

British Telecom, Inc.'s Videocodec VC 2100 coder/decoder provides enhanced picture quality at transmission speeds of 56K, 1.544M or 2.048M bit/sec. The product complies with the CCITT H.261 international standard for videoconferencing, the vendor said. It is available for $44,500.

British Telecom
2560 N. First St.
San Jose, Calif. 95161
(408) 922-0250

Bytex Corp. introduced a product designed to provide network managers with an additional safeguard against localized physical disasters.

The Disaster Protection Switching System enables network managers to transfer control of distributed access units from a disabled primary network switch to a backup switch at a disaster recovery site.

The product is priced between $16,000 and $20,000 for a 1,000-port configuration.

Bytex
120 Turnpike Road
Southboro, Mass. 01772
(508) 480-0840

Infotron Systems Corp.'s Streamline 2510, a multiprotocol X.25 packet assembler/disassembler, line concentrator and X.25 Level 2 switch, includes 32 full-duplex synchronous and asynchronous ports that can be configured independently for any allowable protocol. It can also operate simultaneously with other protocols, the vendor said.

A four-port version costs $5,000, according to the company.

Infotron
Cherry Hill Industrial Center
Cherry Hill, N.J. 08003
(800) 926-9600

Micom Communications Corp.'s Marathon series of data, voice and network servers were designed to integrate data, voice, facsimile or local-area network traffic over low-speed leased lines, the vendor said.

A 5K bit/sec. model combines four different technologies — data compression, speech compression, fax demodulation and fast-packet multiplexing — to reduce the amount of bandwidth that is necessary for data, voice or fax transmissions that run over leased lines, according to the vendor.

Pricing for a 5K bit/sec. model equipped with six ports begins at less than $3,000.

Micom Communications
4100 Los Angeles Ave.
Simi Valley, Calif. 93063
(805) 583-8600

Rad Data Communications, Inc.'s Trimlink-800 can multiplex eight synchronous input channels at rates of 19.2K bit/sec. onto two mutually redundant, 19.2K bit/sec. composite links.

The eight-channel synchronous data compressor includes dual-aggregate links that support the V.32 standard and feature a compression ratio of greater than 4-to-1. A two-link unit is priced at $7,000.

The company also unveiled two CSU/DSUs designed for use with fractional T1 services: the FCD-1M ($1,500) and FCD-1X ($2,000).

Both models enable a synchronous data channel to be connected over a public T1 network without requiring a T1 multiplexer. While connected to T1 networks, the users have to pay only for the amount of bandwidth required, according to the vendor.

Rad Data Communications
151 W. Passaic St.
Rochelle Park, N.J. 07662
(201) 587-8822

Hub help

The intelligent wiring center concept will ease Frito-Lay, Inc.'s expansion from seven to 47 sites next year, said Jack Sprague, consulting systems analyst. Proliferating advances in intelligent wiring center technology will play an important role in the transition, he said.

Intelligent wiring centers — or smart hubs — allow users to connect nodes on a local-area network or interconnect LANs running over different media in a star configuration, which makes network management simpler. Recent developments in hub technology include terminal server support in Racal Interlan's INX5000, FDDI support in Cabletron Systems, Inc.'s Multi Media Access Center, 16M bit/sec. fiber support in Proteon's Series 70 and Synoptics Communications, Inc.'s integration of an Ethernet router into its Lattisnet hub.

In addition, Synernetics, Inc. introduced the Lanplex 5000, which operates many Ethernet LAN segments in parallel and multiplexes them onto an FDDI backbone.

JOANIE M. WEXLER

Ideas. Information. Solutions.

That's what DEXPO West is all about. Meeting people. Sharing information. Finding solutions.

Like how to consolidate and manage your networked VAX systems. How best to distribute information across your multiple VAX sites. What applications to integrate. What terminal servers to select. What backup systems to use.

DEXPO West is the largest DEC computing and connectivity show in the world, with over 300 exhibitors and more than 15,000 products and services. Like spreadsheets and disk drives. Local area networks and monitors. Emulation and windows.

Connect with representatives from the most important computer companies in the market today. Let them share with you the options of multi-vendor integration, software compatibility and freedom of choice.

Call today to register toll free at 800-87-DEXPO. DECUS symposium attendees are always admitted FREE but require separate registration.

DEXPO® WEST 90

The World's largest DEC Computing and Connectivity Exposition

December 11–13, 1990
Mirage Hotel, Las Vegas Convention Center, Las Vegas, Nevada

All Attendees Are Eligible To Win A Free Trip To Australia

VAX and DEC are registered trademarks of Digital Equipment Corporation
DEXPO West is owned and produced by Miller Freeman Expositions, 1050 Commonwealth Avenue, Boston, MA 02215-1135

Presenting All The Sy
Software You'll N

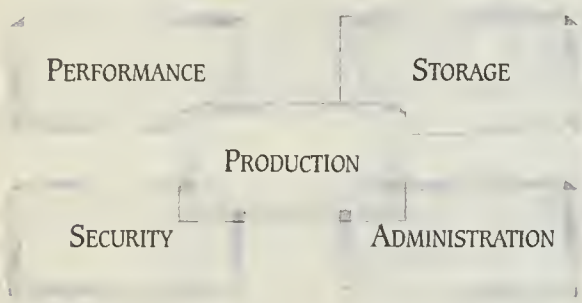
It's going to be quite a decade.

Every employee, every department, every divison will be expected to do more—with less. Including the data center.

Especially the data center.

Demand for improved user service will reach new highs. Budgets and available resources will shrink. To succeed, data center managers will need to do the inevitable.

Automate.



Only CA-UNIPACK solutions enable you to automate entire functional areas of the data center. Working together they deliver the ultimate in data center automation and service level performance.

Automating data center operations is the key to delivering the service levels businesses need to compete in the 90s. And that's why so many companies are turning to us. Over the years we've helped thousands of clients automate their data center operations and today, according to Computer Intelligence, we offer more data center software solutions than anyone else in the world.

While hundreds of niche vendors each offer a few discrete products, our CA-UNIPACK® solutions can automate entire functional areas of the data center such as Production, Storage, Security, Performance Management, and Data Center Administration.

And now, with our new Computing Architecture For The 90s, the levels of integration and automation have been raised even higher. By sharing information and common services, the individual CA-UNIPACKS work together seamlessly across multiple operating systems and hardware platforms.

CA90s

CA's Computing Architecture For The 90s protects and enhances the value of every CA software solution.

The result is consistently higher levels of service. Improved response time. Investment protection. Maximization of personnel and hardware resources. And ultimately, a new breed of data center.

A data center that enables you to play a critical role in helping your enterprise compete and succeed in the 90s.

One of the most critical areas of data center operations to automate is production. We can help you automate all of it with one single step:

Production.

CA-UNIPACK®/APC—Automated Production Control.

It's the most advanced, and integrated package in the industry today and is currently used in thousands of MVS, VSE, and VM data centers around the world.

CA-UNIPACK/APC covers every aspect of automating production control processes including: automatic workload scheduling, automatic console message processing, automatic rerun/restart, automatic report balancing, automatic report manipulation and distribution, JCL validation and automated job recovery.

CA-UNIPACK/APC integrates with other CA-UNIPACKS including the industry's most comprehensive, multimedia solution for system-managed-storage (SMS) and non-SMS environments:

Storage.

CA-UNIPACK®/ASM—Automated Storage Management.

It's by far the best way to maximize your investment in storage and resource management. Unlike IBM's solution, CA-UNIPACK/ASM works in both SMS and non-SMS environments, and addresses both tape and DASD management.

Some of the benefits include: automated tracking of tape library inventory, early warning and recovery facilities, DASD performance measurement, chargeback, destruction protection and automated volume cleanup.

It's the most effective solution for managing both tape and DASD resources.

stems Management eed For The 90s.

CA-UNIPACK/ASM integrates with other CA-UNIPACKS including the most advanced security, control and audit software in the world:

Security.

CA-UNIPACK®/SCA—Security, Control and Audit.

It offers you a secure, protected environment across multiple hardware platforms, operating systems and wherever your distributed processing takes you including MVS, VSE, VM, VMS, networks, DB2 and PC/DOS.

CA-UNIPACK/SCA gives you access control, VTAM network control, network session management capabilities and an automated approach to reviewing operating environments.

It also integrates with other CA-UNIPACKS including the most comprehensive performance management and accounting solution ever developed:

CA-UNIPACK®/PMA—Performance Management and Accounting.

CA-UNIPACK/PMA's integrated approach includes: comprehensive

Performance.

online performance monitoring and historical reporting, expert system technology, resource accounting, chargeback, consolidated reporting and capacity planning.

This software solution also integrates with other CA-UNIPACKS including an automated, comprehensive approach to data center administration:

CA-UNIPACK®/DCA—Data Center Administration.

This integrated solution covers all aspects of data center administration including: inventory management, change management, configuration management and asset tracking.

It can help you produce instant and accurate network availability information. Quickly assess the impact of network failures. Produce current inventory reports. Provide consolidated reporting from multiple platforms such as IBM, Digital and PC's. Cut your vendor reconciliation time in half. Negotiate better maintenance contracts. And do

Administration.

many other administrative tasks that manual, error-prone methods simply cannot handle.

Every one of these CA-UNIPACKS is supported by CA-UNISERVICE®/II. This unique service and support system offers you a direct link between your mainframe and CA's Customer Service around the clock—and around the world.

Altogether, these CA-UNIPACKS can help you create the most productive data center possible.

A data center that's ready for the 90s. For more information on CA-UNIPACKS and all the Systems Management Software you'll need for the 90s, pick up the phone and call 1-800-645-3003.

It could be one of the last manual tasks you do.

And the most productive.

COMPUTER ASSOCIATES
Software superior by design

© 1990 Computer Associates International, Inc.,
711 Stewart Avenue, Garden City, NY 11530-4787.
All trade names referenced are the trademarks or registered trademarks of the respective manufacturer.

Now you can have high-speed data without taking on the whole pipe.

**AT&T's ACCUNET®
Spectrum of Digital Services
gives you the capacity and bandwidth
that fits your company's needs.**

Now you can upgrade your private network's capacity without carrying a full 24-channel load. Our ACCUNET Spectrum of Digital Services lets you expand at your own pace with only the number of channels you need. And no matter how small your particular piece of the pipe happens to be, ASDS gives you all the options you could want.

Choose from speeds of 9.6, 56, 64, 128, 256, 384, 512 or 768 kbps. Whether you need capacity for voice, bulk data transport or SNA Polling, or bandwidth for special applications like image processing, video conferencing or CAD/CAM, ASDS can accommodate your needs. We've also got more locations than any comparable service. More than 500 in all.

When it comes to reliability, you can't do any better than AT&T. AT&T offers its customers the highest percentage of error-free seconds of any digital carrier.

And then there are the features that will appeal to your budget managers. Since we have more points of presence than anyone else, chances are you can take advantage of lower access charges. And, of course, there's the whole point of going the ASDS route in the first place: you only pay for the capacity you need.

So if you need to add capacity to your network but you don't want to take on the whole pipe, give us a call. If we haven't already, we can probably take a load off your mind.

Value. Another AT&T advantage.

For more information about the ACCUNET Spectrum of Digital Services, call your AT&T Account Executive or **1 800 247-1212, Ext. 107.**

AT&T
The right choice.

© 1990 AT&T

EXECUTIVE TRACK

Peter Kenyon has joined **Silicon Graphics, Inc.** in Mountain View, Calif., as vice-president of information services, reporting to Ken Coleman, senior vice-president of administration.

Kenyon, 46, was most recently president of Pactel Meridian Systems, a partnership between units of Pacific Telesis Group and Northern Telecom, Inc. Kenyon joined Northern Telecom in 1982 and has held positions in finance, information services and general management. His last position there was vice-president and general manager of the Meridian Terminals Division. Kenyon holds a degree in finance from Liverpool College of Commerce.

Share, Inc., the Chicago-based association of users of large IBM systems, recently announced its board of directors for 1990 to 1992.

Sandy Moy of the University of Washington was named president, **John A. Chapman** of Amoco Corp. was named vice-president, **John H. Bevis** of the University of Florida's Northeast Regional Data Center was elected secretary and **Lois Hoyer** of Northern Trust Bank was named treasurer.

New directors are **Anne Calouri**, U.S. Army Systems Software Center; **Bill Choate**, Emory University; **Cynthia Combs**, United Services Automobile Association; **Tom Rupsis**, John Hopkins Applied Physics Lab; and **David C. Thewlis**, Kaiser Permanente Medical Care Program.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

'Mad scientist' turned IS chief

Howard Ory revitalized sleepy IS group at Centers for Disease Control

BY JOSEPH MAGLITTA
CW STAFF

He's a physician and epidemiologist who wears flannel shirts one day and his white Navy captain's uniform the next. He likes to tape cartoons to his office door, jokingly describes himself as a "scientist gone mad," has appeared on *Good Morning America* and has been interviewed by *Cosmopolitan* magazine.

Howard Ory is not your average information systems director.

Yet here is Ory, a noted authority on birth control, in charge of all computing and telecommunications at the Centers for Disease Control (CDC), the Atlanta-based federal agency charged with public health education and disease prevention in the U.S.

In just five years, Ory, a self-described "sophisticated end user" working at his first computer job, has transformed a sleepy IS shop into a modern, dynamic organization that is admired on Capitol Hill as a model of government computing. CDC's new on-line information system, called Wonder, has drawn congressional praise and was a finalist in this year's *Computerworld Smithsonian Awards*.

As director of CDC's Information Resources Management Office (IRMO), the mustachioed 46-year-old acts as a liaison between CDC's 6,000 users and 200 IS employees and contractors from his office in the outskirts of Atlanta.

A witty and articulate speaker, Ory — whose only formal IS education consists of a couple of in-house programming courses — is probably CDC's most active technology evangelist.

PROFILE: Howard Ory

Ann States/Saba

Position: *Director of information resources management, Centers for Disease Control*
Achievements: *Transformed an ineffective IS shop into one now described as a model of government computing*

"Howard is uniquely qualified to head up IRMO," said Glenda Cowart, CDC's director of program support and Ory's boss. "He carries a lot of respect at CDC because of his personal accomplishments."

So how does one go from being a physician and research scientist to becoming IS chief at one of the government's most visible agencies?

"I learned to compute as soon as I came to CDC," Ory recalls. "I was involved in analyzing large data sets. After doing those on a card sorter, I figured there had to be a better way."

Ory, a native of Worcester, Mass., began as a epidemiological researcher at CDC headquarters in 1971. For 14 years, he continued his work exploring the medical side-effects of birth control pills, rising through the ranks to become an assistant program director.

To popularize his research, Ory did interviews on television shows such as *Good Morning America* and *The CBS Morning News* and national magazines such as *Cosmopolitan*, *Redbook* and *McCall's*. During this time, his work with computers was largely limited to using SAS Institute, Inc. software for data analysis.

Then, in 1984, Ory's career took an unexpected turn. Former CDC director James Mason ordered a business study to help the agency find ways to

Continued on page 84

Is automation turning managers into clerks?

BY SALLY CUSACK
CW STAFF

Are managers actually spending *more* time performing clerical tasks now than they did before office automation? An economist at the Georgia Institute of Technology said they are — because secretaries and support personnel are being replaced by office automation technology.

"By and large, computers are not a good substitute for secretaries," said Peter G. Sassone, a technical economist at Georgia Tech's School of Economics in Atlanta.

Sassone noted that while computers can make substantial contributions to clerical efficiency, there are many tasks they are not equipped to handle.

"Secretaries do a wide variety of tasks, from sorting mail to making travel arrangements, and if a secretary is eliminated by office automation, the aforementioned tasks often fall to the managers themselves — not a productive way for professionals to spend their time," Sassone said.

Using a special method for analyzing work profiles, Sassone studied 1,563 employees in 77 offices in four Fortune 50 companies.

The study of 184 middle-level managers found that they devoted 16% of the work week to administrative support tasks, including filing, making copies and typing. Sassone said he suspects that the findings do not reflect the activities of top-level executives, who are more likely to work with a large support staff. "We were looking at the broad middle of these companies, where most of the payroll dollars are spent," he said.

Sassone stressed that office automation is basically a complementary, not substitute, technology for the workplace. Substituting technology for people is not always effective, he cautioned.

So what is his advice to corporate America? "Be wary of 'substitutional' strategy — people saying things like 'we can reduce the staff by half,' " he said. "Instead, be ready to use technology to enable people to make the maximum professional contribution."

Ory

CONTINUED FROM PAGE 83

more effectively use information technology. Ory found himself on the committee performing the study.

"My boss at the time said, 'I don't want to do it — you do it,' " Ory recalls. "So I went off to the woods for three months."

Among the group's recommendations was for IS to be headed by a CDC researcher. As the only researcher on the committee, Ory was chosen as the founding head of IRMO. His first step was to unite scattered IBM and Wang Laboratories, Inc. resources with telecommunications and to set a new direction for IS.

"It was a classic old-line [data processing] shop," Ory explains. "The head was an engineer. By and large, the people in it were more interested in the computer for the computer's sake rather than for the user's sake."

Ory quickly learned a lesson that has become the cornerstone of his management approach: Surround yourself with the best available technical talent. "If you've got a handicap, if you don't know something, you've got to bring someone in like a Seeing Eye dog," he says.

He started by signing on luminaries from the old IS staff, who then helped pick out other "keepers." Former mainframe wizard Jerry Sanders became chief of the information technology branch, software guru Jerry Gentry became assistant director of research and development, and John Davis, a 28-year veteran, became assistant director of technical operations.

By 1987, thanks to hirings, firings, promotions and retirements, the IS department had a new look. Today, fewer than two dozen employees remain from the old IS staff of approximately 100.

Some of Ory's management team members have backgrounds as eclectic as his own. For example, Joseph Reed, head of applications development, was a physics professor who had spent eight years at a major accounting firm. Andy Freed, a driving force behind the Wonder system, is a physician.

After nearly six years on the job, Ory said he is convinced that a nontechnical person can effectively lead IS. Instead of worrying about every detail, Ory says he is free to think about the larger issues of using information technology to enhance the organization's mission.

"My job is to enunciate the vision and somehow encourage [staff members] to buy into that vision and keep them in the same direction," he says.

Ory's methods seem to work. During the last few years, his team has transformed an IBM 3090 200E mainframe, Cobol and 3270 terminal environment into a modern cooperative processing network with various local-area networks and shared databases.

More than 95% of CDC's knowledge workers have personal computers on their desks, and some 2,000 voice-mail users send nearly one million messages per year.

"Howard is visionary, creative and incredibly energetic for someone at this point of his career," says Jim Seligman, IRMO's deputy director. "He's built a good crew that we can trust universally."

Taking a hands-off approach sometimes means that Ory must spend time sorting out conflicts among technical staff members.

"There's always a lot of constructive conflict going on. My job is to referee that and to make sure that the conflict is always constructive," he says.

> "I'M AN OUTSIDER, but that's a tremendous advantage . . . After five years of delivering product after product, there's some sense that I listen harder to what the scientists want."
>
> HOWARD ORY
> CENTERS FOR DISEASE CONTROL

Despite these occasional rocky moments, Ory sticks by his approach: "Delegate cleanly; trust them. Once you agree on the vision, it's their job to deliver it. It's not my job to stand over their shoulder."

Despite his new duties, Ory still manages to work on birth control research and occasionally dons the white uniform of the U.S. Public Health Service. Still, his big focus is on fostering technology growth.

After five years, does Ory consider himself an IS professional? "I'm an outsider," he says, "but that's a tremendous advantage. The problem with the old DP shop was that the scientists didn't trust them, didn't trust that they'd get what they wanted from them. After five years of delivering product after product, there's some sense that I listen harder to what the scientists want."

Through it all, Ory tries to keep things light. The cartoons taped to his office door are a constant reminder not to get too heavy. "That's something my wife, who is a psychotherapist, taught me," Ory says. "If you don't use humor, you intimidate people."

Laughing, he adds, "Probably by now, I've been in the job long enough that they don't trust me either. But I'm working for the people I'm supposed to be helping."

Does coming from an end-user background in itself bring greater credibility? "At least they don't dismiss me out of hand," he laughs. "They think I'm just a scientist gone mad."

COMDEX. The world's premier computer distribution trade show and conference.

COMDEX/Fall '90 this November in Las Vegas is the main event. If you miss it, you'll miss out.

It's the unparalleled opportunity for resellers and in-house volume resellers to see the latest innovations, hottest new products, and newest dealer support programs.

It's also a well-known source for new information that can sharpen your competitive edge—by giving you the latest insights on the best new business opportunities.

And COMDEX is your chance to network and make important new business contacts, unavailable at any other event.

COMDEX/Fall '90 is endorsed by the U.S. Department of Commerce Foreign Buyer Program. That means more international exhibitors, and more opportunities for you to establish worldwide trade relationships.

Plan to preregister for COMDEX to get special savings on airfare and hotels! Mail in the coupon today.

COMDEX/Fall '90
The Trade Show for Computer Distribution Professionals
November 12–16 • Las Vegas, Nevada USA

©1990 The Interface Group • 300 First Avenue, Needham, MA 02194 USA

"YES! I want to expand my world of opportunity at COMDEX/Fall '90."
November 12–16, 1990
Las Vegas, NV USA

☐ Please send complete Attendee information.

Name _____

Title _____

Company _____

Address _____

City _____ State ____ Zip ____

Phone (____)_____ Fax (____)_____

Mail to: COMDEX/Fall '90, Direct Marketing Services, 300 First Avenue, Needham, MA 02194 USA
Tel. (617) 449-6600

C09878-90 CW 10/15

In designing the new 386SX notebook, Epson engineers had to weigh a lot of options.

KEYBOARD

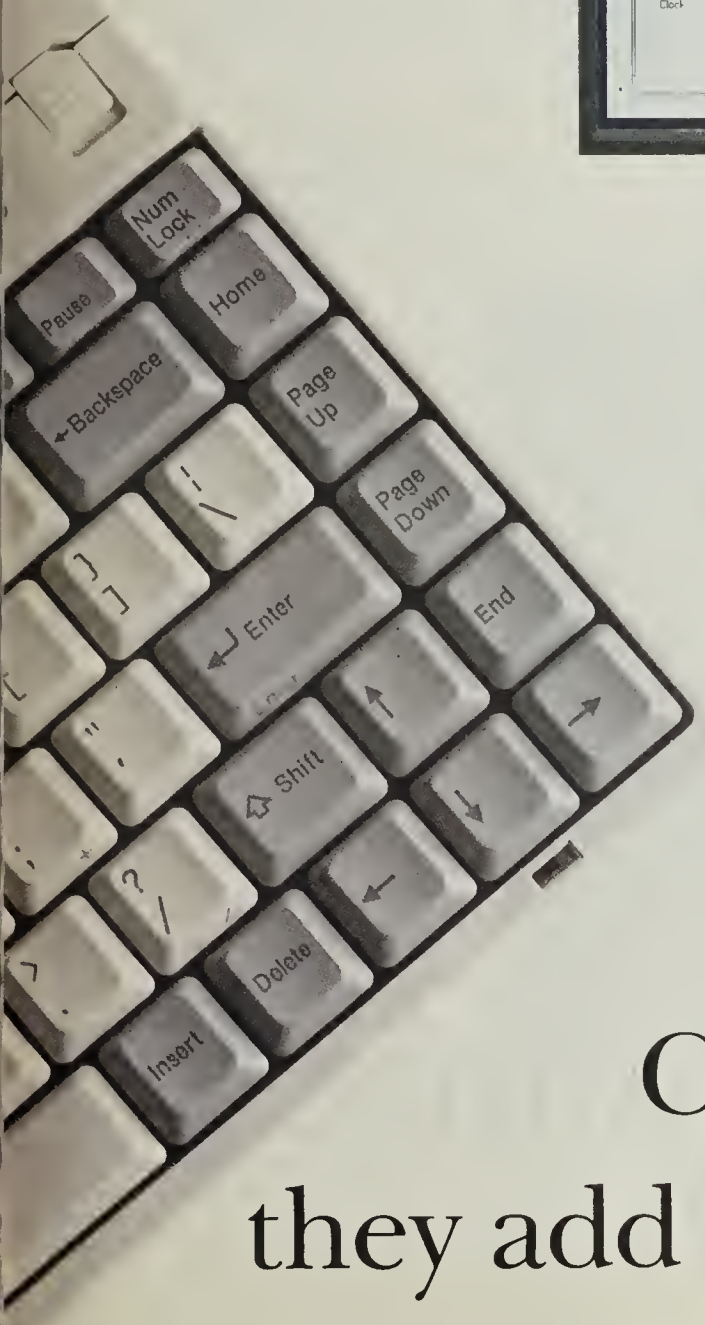
As this actual size photograph shows, the NB3s has a large, comfortably sized keyboard.

STORAGE

The Epson NB3s comes with a 40 MB or a 20 MB Conner* hard disk drive, a standard 3.5 inch floppy drive, and an optional internal modem.

VGA

The large backlit, 640 x 480 resolution LCD screen includes 16 gray scales for sharp black-on-white VGA graphics.



386SX

Finally a notebook computer with the power and performance of a 386SX and up to 5 MB of RAM to run all of your most popular applications, including Windows™ 3.0. You can even install an optional math co-processor.

Combined, they add up to 5.8 pounds.

In a world where PC users demand uncompromised performance from a portable computer, Epson® introduces a 5.8 pound engineering breakthrough that dispels the notion that less weight means less computer.

The product is the new Epson NB3s. The performance is that of a 386™ SX desktop, with up to 5 MB of RAM, a choice of a 40 MB or 20 MB hard drive, and VGA technology for sharp, legible graphics—all in an 8.4 x 11.8 x 1.7 inch computer.

That combination of power and portability makes the Epson NB3s the perfect computer for people who simply don't believe in compromise.

Pick one up at COMDEX.

To see how light a 386SX notebook can be, you'll have to pick up an Epson NB3s. To see how fast and powerful it can be, you'll have to spend a few minutes working with this high performance notebook computer.

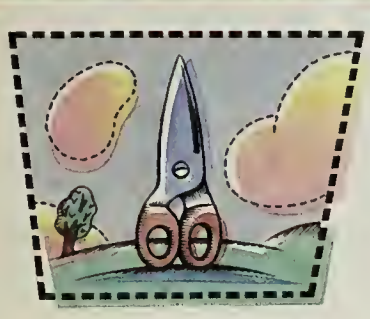
You can do both at COMDEX. The new Epson NB3s notebook computer will be on display in booth 1178 in the Las Vegas Convention Center's East Hall, so you can weigh all your options yourself. At the same booth, you can also see our entire new line of desktop computers and laser printers, including a new Postscript® model.

Engineered For The Way You Work™.

EPSON

386 is trademark of Intel Corp. Postscript is a registered trademark of Adobe Systems, Inc. Windows 3.0 is a trademark of Microsoft Corp. Conner is a registered trademark of Conner, Inc. © 1990 Epson America, Inc. 2780 Lomita Blvd. Torrance, CA 90505. **(800) 922-8911.**

CLIPS



Tim Lewis

Summaries from leading scientific and management journals

"Information partnerships — Shared data, shared scale"

By Benn R. Konsynski and F. Warren McFarlan

Harvard Business Review
September-October 1990

■ Developments in data communications, storage and retrieval have facilitated the exchange of information between companies. As a result, businesses can join forces *without* merging more easily than ever before. Diversification becomes possible while maintaining corporate focus on a core line of business.

Information partnerships can facilitate joint marketing and the development of new channels of distribution for services. By sharing investments in hardware and software, companies can reduce their financial and technical risk.

There are four types of information partnerships: joint marketing, such as IBM and Sears, Roebuck and Co.'s Prodigy effort; intra-industry efforts, such as the value-added network tying together many U.S. insurance firms; customer-supplier partnerships, such as the information systems network linking Baxter Healthcare to its clients; and vendor-driven relationships, such as the electronic data interchange network set up by General Electric Information Services.

What are the keys to building such successful "information partnerships?" To start, senior management at participating companies must share a common vision of the partnership's goals, or the partnership will come to a halt. Other success factors include the need to bring reciprocal skills in information technologies to the deal and to make sure interconnecting hardware and software is technically feasible. Some coordination of technical and business policies will also be necessary in order to ensure that information can be packaged and shared in ways that are mutually beneficial to all partners. — Amiel Kornel

"Evaluating alternative computer acquisition strategies"

By David Ameen

Journal of Systems Management
September 1990

■ There is plenty of advice on how to select the right hardware but very little professional literature on choosing the least costly way to acquire that hardware. Leasing, renting, purchasing and third-party leasing plans are the four major acquisition options, but each one has its advantages and disadvantages.

For example, an outright purchase requires a large initial capital outlay but is less expensive in the long run, assuming that the hardware is kept for several years.

A cost-benefit analysis of various acquisition strategies requires the IS manager to establish financial objectives and identify relevant assumptions, such as the cost of capital, the economic life of the equipment and its salvage value. Then these variables are plugged into a cash-flow equation to produce a ranking of the acquisition plans.

Because some of the assumptions used in the equation require predictions of future technology and economic conditions, IS managers should conduct a sensitivity analysis to see how much the results would change under different circumstances. — Mitch Betts

"Groupware in practice: An interpretation of work experience"

By Christine Bullen and John Bennett

MIT Center for Information Systems Research
Working paper, March 1990

■ Corporate interest in groupware, software intended to enhance the productivity of organizations through the use of electronic mail, centralized scheduling and other functions, is increasing.

Before such a product is implemented, management should be careful to understand the following:

- People report most value from tools that parallel their nonelectronic activities, so it follows that E-mail is the most widely used groupware function.
- Users must feel that the benefit outweighs their effort in learning to use and using the system. Calendaring systems are often considered too clumsy and difficult to use to be worth maintaining.
- Groupware intervenes at both a technological and social level. It introduces changes both in the methods used by a group and in the interactions of the group.
- Work processes may need to be redesigned to function more smoothly with the new technology. — Chris Lindquist

"Our ISI printers are solving problems the IBM printers couldn't."

Unlike other plug-compatible manufacturers (PCMs), we do not build terminals, drives, or keyboards. Only printers. Our engineers work on nothing else. They combine over 150 years of experience in producing plug-compatible printers for IBM mainframe and mid-range system users.

This focus enables us to respond quickly to changes in IBM technology, while building into our printers the advanced output and paper-handling capabilities that IBM and other manufacturers simply don't deliver.

Our printers are shop-floor rugged, yet office-friendly. Simple loading and operations make them easy to use for anyone. And since they connect directly to your IBM systems, you don't have the mess of boards, boxes, or other gadgets.

With Interface Systems, you get proven reliability. Since 1975, we've manufactured plug-compatible printers for thousands of IBM 3270, S/3X, and AS/400 users. Each model is backed by complete documentation, service, and technical support.

You also get PCM economy. Our printers cost much less than corresponding IBM models...extra features and all.

To learn more, call us today at **1-800-544-4072**. Or write to us at 5855 Interface Drive, Ann Arbor, Michigan 48103. FAX: 313/769-1047.

Interface Systems, Inc.
Printer Solutions for IBM Systems

Government agencies -- ask about our GSA prices!

Tips for smooth software sailing

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — In software development, it's best to look before you leap.

James Wetherbe, a University of Minnesota professor who runs the school's MIS Research Center, said he believes that managers of software projects often do not allow themselves enough time to analyze their objectives, dooming their software development efforts. The goals of zero-defect software, simplified maintenance and flexibility can only be reached by those who have taken the time to reflect, Wetherbe maintains.

"You get the vision, and then you realize you can't get there from here," Wetherbe told some 50 systems development professionals attending a recent Association for Systems Management seminar here.

Beyond technology, software managers must learn to orchestrate their project staff, much as a coach assigns players in a game of pickup basketball, Wetherbe said. Some team members are better suited to interview end users about software requirements, while others are better at coding or keeping the project on track and on time.

To detect errors or bugs in the code, extensive testing is in order. "Your feedback loops have to move both backwards and forwards so that errors get detected before your system ever affects the customer," Wetherbe said. "By installing a total-quality program, you can determine whether a problem is coming from the software code or from an ill-conceived invoice that you're trying to automate."

End users will be happiest if goals are kept within reach. Cross-functional joint application design groups can often isolate key systems parameters.

"Prototyping generates excitement," Wetherbe said. "It brings reality to the concept behind the system. Even though you have to make it clear that the prototype is just that — it's not a completed system — the client can see where you're going."

If they are seeking quality, software managers should try to pilot their projects, just as airline pilots guide their aircraft through crowded skies, Wetherbe said. Their software programs should "fly" as well as jumbo jets do — with only a few mishaps among the millions of lines of code (or passenger miles, as the case may be).

"If you have the same error rate as the airport's luggage-handling facility," Wetherbe said, "you know you're not doing everything right."

MANAGEMENT BRIEFS

IUA adds on to its rolls

Former Cullinet Software, Inc. and Applied Data Research, Inc. (ADR) database users are now united in the same organization. **The IDMS User Association (IUA)** recently approved the addition of **Complete Applied Data Research Environment (CADRE)** into its international organization.

Both former companies and their product lines are now part of Computer Associates International, Inc. ADR users will be included in the IUA's annual user conference, IUA '91, slated to be held in Salt Lake City on April 14-18, 1991.

Uniforum, the international association of Unix users, awarded its first $10,000 research grants to two graduate students studying computer science and management science.

The winners were Kevin R. Fall, a Ph.D. candidate in computer science and engineering at the University of California at San Diego, and Basil A. Sherlund, who is pursuing a master's degree in computer science at Wayne State University in Detroit.

CALENDAR

OCT. 28 - NOV. 3

CIO Information Strategies Conference. Palm Springs, Calif., Oct. 28-30 — Contact: Lori Cardarelli, CIO Magazine, Framingham, Mass. (508) 872-8200.

Telon International Users Conference. Orlando, Fla., Oct. 28-31 — Contact: Anthony J. Paoni, Pansophic Systems, Lisle, Ill. (800) 344-8573.

Knowledge-Based Systems in Everyday Use: Increasing Productivity and Profits. Chicago, Oct. 29-30 — Contact: Donna Kacin, Decision Support Technology, Cambridge, Mass. (617) 354-6400.

The Hammer Re-Engineering Conference. Cambridge, Mass., Oct. 29-31 — Contact: Hammer and Co., Cambridge, Mass. (617) 354-5555.

Electronic Data Interchange for Government: New Approaches to Information Collection and Dissemination. Washington, D.C., Oct. 30-Nov. 2 — Contact: USPDI, Silver Springs, Md. (202) 445-4400.

Unicom '90. Washington, D.C., Oct. 31-Nov. 2 — Contact: North American Telecommunications Association, Washington, D.C. (202) 296-9800.

Unix Expo '90. New York, Oct. 31-Nov. 2 — Contact: National Exhibitions, New York, N.Y. (212) 391-9111.

Evaluating CASE Tools. Atlanta, Nov. 1-2 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

NOV. 4 - 10

Adapso Management Conference. Phoenix, Nov. 4-7 — Contact: Adapso Education Department, Arlington, Va. (703) 284-5355.

Decision Support and Executive Information Systems: A Managerial Perspective. Cambridge, Mass., Nov. 5-6 — Contact: Decision Support Technology, Boston, Mass. (617) 482-3596.

Successful Implementation of Imaging Technology. Boston, Nov. 5-6 — Contact: KPMG Peat Marwick Executive Education Registrar, Montvale, N.J. (800) 762-3932.

CASE: The Next Generation. Washington, D.C., Nov. 5-7 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

iSDN Week. London, Nov. 5-9 — Contact: IGI Europe, London, England (011) 41 61 6915111

Association for Computing Machinery Conference. Arlington, Va., Nov. 6-7 — Contact: Jim Adams, ACM, New York, N.Y. (212) 869-7440.

Messaging '90. New York, Nov. 6-8 — Contact: Information Publishing Corp., Houston, Texas (713) 974-6637.

Digital Dealers Association Annual Meeting. Tucson, Ariz., Nov. 6-9 — Contact: DDA Administrative Office, Chelsea, Mich. (313) 475-8333.

Computer, Office Systems & Services Conference. Houston, Nov. 7-8 — Contact: Show America Management, Houston, Texas (713) 890-0397.

Design Engineering Show and Conference. Atlanta, Nov. 7-9 — Contact: Design/South, Stamford, Conn. (203) 964-0000.

GE Information Services Business Communications Users Group Meeting. Orlando, Fla., Nov. 7-9 — Contact: Wendy Herman, GE Information Services, Rockville, Md. (301) 340-4977.

GIS/LIS. Anaheim, Calif., Nov. 7-10 — Contact: GIS/LIS, Bethesda, Md. (301) 493-0200.

Expo Comm China '90. Beijing, China, Nov. 8-13 — Contact: Ron Akins, Krause & Associates, Bethesda, Md. (301) 986-7800.

Southeastern Small College Computing Conference. Hickory, N.C., Nov. 9-10 — Contact: Dr. Frank Cheatham, Campbellsville College, Campbellsville, Ky. (502) 465-8158.

NOV. 11 - 17

Share 75.5. Fort Worth, Texas, Nov. 11-14 — Contact: Share, Chicago, Ill. (312) 644-6610.

Computer-Canada First! Toronto, Nov. 12-14 — Contact: U.S. Department of Commerce, Office of Canada, Washington, D.C. (202) 377-3718.

Autofact '90. Detroit, Nov. 12-15 — Contact: SME, Dearborn, Mich. (313) 271-0777.

Comdex/Fall '90. Las Vegas, Nov. 12-16 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

Supercomputing '90. New York, Nov. 12-16 — Contact: Malvin Kalos, Cornell Theory Center, Cornell University, Ithaca, N.Y. (607) 255-7157.

Hawaii's Governor's Symposium on High Technology: Making Strategic and Technical Alliances for East-West Software Development and Trade. Lihue, Kauai, Hawaii, Nov. 13-15 — Contact: High Technology Development Corp., Mililani, Hawaii. (808) 625-5293.

Wescon/90. Anaheim, Calif., Nov. 13-15 — Contact: Wescon/90, Los Angeles, Calif. (213) 215-3976.

National Conference and Exposition on Electronic Image Management in Government. Washington, D.C., Nov. 13-16 — Contact: Conference Manager, USPDI, Silver Springs, Md. (301) 445-4400.

The Power. The Productivity. The Performance.

Everything You'd Expect from IBM and SAS Institute. Plus One Thing More.

A promise. The SAS Applications System has everything you need to exploit the full potential of the new IBM Enterprise System/9000™ family of processors.

No other software provides such a wide range of integrated applications...such common-sense user interfaces...such transparent data access...or such commitment to supporting the Enterprise Systems Architecture/390.™ And SAS Institute's ongoing commitment to the Systems Application Architecture™ is stronger now than ever before.

The SAS System also supports *vector processing*, which lets you run sophisticated analytical applications in less time...and gain better performance from system resources.

Gain Total Control in Four Strategic Areas... on ES/9000 Processors and Beyond.

Data Access

- □ Full compatibility with ESCON and fiber optic channels
- □ Transparent access to the latest releases of DB2™ and SQL/DS™
- □ Relational access to flat files, VSAM files, relational databases, or hierarchical databases.

With the SAS System, you can access data via relational views...just by calling a data view into your application using a single name. You don't have to know syntax or the internal structure of the data file.

Data Management

- □ SystemView support through a common user interface
- □ SQL support
- □ Data-handling utilities.

The SAS System lets you manage relational data with the industry-standard SQL language. It's easy to enter new data into the system...retrieve data as needed...and edit and query data files. You can even merge data from dissimilar files.

Data Analysis

- □ Unrivaled analytical capabilities including regression, analysis of variance, linear modeling, and more
- □ Reliable tools for business planning, forecasting, and decision support
- □ Specialized applications such as statistical quality improvement and matrix programming.

Regardless of your analytical needs—from computer performance evaluation to executive information systems—the SAS System is the standard by which other software is measured.

Data Presentation

- □ Automated and ad hoc report writing
- □ Business and analytical graphics
- □ Mapping
- □ Business correspondence.

Take Advantage of Customized Interfaces for Both New Users and Power Users.

A task-oriented, menu-driven interface lets you interact with your data in an intuitive, "point and click" manner. There is no syntax to learn, nor complicated menu paths to navigate.

The SAS System also includes a command-driven programming interface. Experienced users and applications programmers can directly access the powerful SAS command language...and customize the programming environment with pull-down menus for file management, editing, and other essential tasks.

Create Applications and Share Them with Virtually Any Other Environment—Quickly and Easily.

The SAS System offers a productive applications development environment. You can package a complete application and invoke it with a single command, and build menus and fill-in-the-blank screens for any application you choose.

What's more, the SAS System is portable across the entire range of computing platforms—from micro to mainframe and practically everything in between. That gives *you* the power to decide where a particular application belongs—in the data center, at the department level, on the desktop, or a combination of all three.

Try the SAS System FREE for 30 Days.

With more than *two million users* worldwide, the SAS System is the leading applications system. And we back our software with the industry's most reliable technical support, documentation, training, and consulting services.

For more information about the SAS System, and to arrange your free 30-day evaluation, call your Software Sales Representative today at 919-677-8000 or fax us at 919-677-8123. In Canada call 416-443-9811.

SAS Institute Inc.
Software Sales Department
SAS Campus Drive □ Cary, NC 27513
Phone 919-677-8000 □ Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc.
IBM is a registered trademark, and ™ indicates a trademark, of International Business Machines Corporation.

Copyright © 1990 by SAS Institute Inc.
Printed in the USA. 9/90

IBM Business Partner
Authorized Cooperative Software Supplier

With software problems delaying shipment of orders, management wrestles with excess inventory.

This manufacturer's order processing software was developed with outdated methods. If you want modern tools for developing quality software, call KnowledgeWare. Our Computer Aided Software Engineering (CASE) tools are helping thousands of users develop better software in less time. In a *Computerworld* survey, CASE users rated our tools best by a wide margin. And our close relationship with IBM makes us the natural choice of IBM users.

For more information on KnowledgeWare CASE tools, call 1-800-338-4130. KnowledgeWare, Inc., 3340 Peachtree Road N.E., Atlanta, GA 30326.

KnowledgeWare®

The World's Most Comprehensive CASE Tool Set™

IBM Business Partner

Marketers dig for openings in a blizzard of raw data

BY BARBARA FRANCETT

Without information technology, Mauna La'i guava drink wouldn't be on your supermarket shelf today. A minor tragedy? Not to Ocean Spray Cranberries, Inc., its maker. Mauna La'i carved out a piece of new territory for Ocean Spray — tropical juice drinks — and provided an important new source of revenue. It was an opportunity that the firm nearly missed.

Initial test market results for the product were not promising, says John Tarsa, operations manager of information services, a marketing support group at the Lakeville, Mass., firm. Indications were that the product would not meet sales objectives. Ordinarily, Tarsa says, that would have meant the product would never see mass distribution. In this case, however, the company decided to go a step further and recheck the product's prospects through an electronic test market service run by Chicago-based Information Resources, Inc. (IRI). This further analysis "showed that the depth of repeat purchases would make up for the lack of volume in the trial," Tarsa says.

Based on the findings, Mauna La'i was launched. "It's been very successful, but if we had been using only traditional methods," Tarsa says, "it would have been killed."

Since that time, Ocean Spray has supplemented its traditional market analysis tools with two systems from IRI — a decision support tool called Dataserver and an expert system for pattern analysis called Coverstory.

All market researchers know that new markets and new products are key to maintaining and expanding market share. Increasingly, what they are also discovering is that information systems can help them to uncover hidden opportunities amid the masses of facts and figures routinely collected about both new and existing products.

Reinhold Spiegler

Nyce (left) and Nash *say Cadbury's IS and marketing departments work hand-in-hand to get the most from database resources*

At Cadbury Beverages, Inc., the Stamford, Conn.-based maker of Canada Dry and Hires carbonated beverages as well as Mott's applesauce, IS works closely with market researchers to filter actionable information from massive data flows. "It's a team effort," says Joe Nash, vice-president of MIS.

Support from IS for the market research group, however, is limited by design. "We provide hardware support and communications support, but we're not involved in software and database maintenance. We do provide shipment information to the syndicated services," Nash says. "We complement each other."

Two of the primary tools used to filter data are the same ones now in use at Ocean Spray.

Most of the data at Cadbury Beverages comes from Universal Product Code, or scanner, data gleaned at grocery stores and sold by syndicated services. "Data sets at the UPC level are huge. Without an electronic interface, this data is almost impossible to use," says Jim Nyce, vice-president of marketing coordination and research.

Cadbury obtains scanner data from IRI's Infoscan service and from A. C. Nielsen Co.'s Scantrack. Both syndicated services sell data by categories as well as summary-level information covering sales trends, pricing and approximate market shares for all product categories.

In the quest for opportunities to extend product lines or launch new products, Nyce combs through this scanner data, using Dataserver for a first-cut examination and then Coverstory for more refined analysis.

The search process typically starts in familiar territory. "First, we look for opportunities in our own product categories . . . subcategories of products that perform better than average," Nyce says.

Sometimes, however, interesting outcroppings appear in unexplored areas. When that happens, the next step is usually to pull up additional information from one of the syndicated services and subject it to intensive analysis in hopes of identifying potential buyers. This type of analysis led to an addition to Cadbury Beverages' Holland House line of cooking wines.

What the firm discovered when it began looking into the marinade category, Nyce recalls, was a growing area without a significant national presence. "There were a number of small regional brands but no national brands, so there wasn't much competition," he says.

For Cadbury, demographic information on potential purchasers, in combination with data on product sales and competition, was enough to convince the firm to move ahead. Sometimes, however, companies want a more qualitative picture of potential purchasers.

For this closer look, they turn to a different category of databases — ones that go beyond location, age, number of children and education level — to address lifestyle factors such as kinds of books read, television viewing choices and vacation preferences. These databases categorize consumers by lifestyle into profiles called "clusters" — enabling market researchers to better target their efforts.

One such product is currently being used by The Buick Motor Division of General Motors Corp. in Flint, Mich., in conjunction with its owner records database. Prizm, a market segmentation database packaged on compact disc/read-only memory from Claritas Corp., defines U.S. neighborhoods by ZIP code

Continued on page 96

INSIDE

Can you shrink test markets?
Page 100

What marketing wants in a system
Page 104

Francett is a free-lance writer based in Bloomfield, N.J.

Free Your Or
The Limitations Of

ganization From Conventional Systems.

Introducing Cooperation.™ The Open Enterprise Integration Environment.

Conventional systems have spawned islands of information that separate departments and impede workflow more effectively than any wall.

The answer is NCR Cooperation. Software that integrates the general-purpose applications and platforms in your organization into one flexible, cooperative system with a consistent, intuitive graphic interface.

Cooperation benefits everyone in your organization. It lets MIS managers integrate multimachine, multivendor, multistandard environments, with the tools needed to create and manage a complete enterprise-wide network.

Its Business Information Monitor facilities allow executives to access the entire knowledge base of the enterprise from their own workstations.

And it aids software developers by speeding both new application development and the extension of current mainframe and minicomputer applications.

Cooperation allows access to your enterprise's resources from every desktop. It features powerful tools, including the latest in distributed *object* technology, that insulate both software developers and users from the complexities of the operating environment. Object-oriented programming lets developers reuse code, easing the job of building or modifying complex programs. And reducing the time and cost of development and training.

Cooperation can set your organization free from the rigid, hierarchical computer architectures of the past. Free from dependence on the vision of a single vendor. Free to meet the challenges of the future as you see fit.

To unleash the power of Cooperation in your organization today, phone 1-800-CALL NCR.

NCR

Open, Cooperative Computing.
The Strategy For Managing Change.

NCR is the name and mark of NCR Corporation. Cooperation is a trademark of NCR Corporation. © 1990 NCR Corporation.

Continued from page 93

according to 40 cluster types, with such names as Furs and Station Wagons, Black Enterprise and Shotguns and Pickups.

Prizm can be customized through the embedding of other categorization systems, databases and surveys. For example, the version Buick uses contains Arbitron Ratings Co.'s defined areas of dominant influence (ADI) for TV viewership. "We can run owner records and know what ZIP codes fall into ADI markets," says Paula Tarvenia, associate administrator in market research at Buick. "We can go into an ADI market, pull it apart and take a more microscopic look at it by ZIP code, census tract or block group for new opportunities. It's a nice way to find out who our customers are and how they fit into various lifestyles in relationship to each of our car lines."

Tarvenia's group uses Compass, a personal computer-based software system from Claritas, to analyze Prizm data and integrate it with company-collected data on existing customers. "It helps us get more into the consumer's mind," Tarvenia says. "For instance, Buick Reattas are very upscale two-seaters. People who buy them are on the go, they read a lot, they're into financial activities. A Buick Century, on the other hand, is not so upscale. Their buyers have a different lifestyle. We need to understand that."

At Perpetual Savings Bank in Washington, D.C., Tim Evans, director of marketing services, uses both Prizm and another segmentation system designed specifically for the banking and financial industry. This database, The Customer Information System (CIS) from Harte Hanks Data Technologies, runs on a mainframe at Harte Hanks and is accessed and analyzed using a PC software program called PCIS.

Downloaded information from CIS can also be imported into Claritas' PC-based Compass system for combination with Prizm data via a menu-driven interface developed by the two vendors at the bank's request. CIS gives Perpetual Savings a clustered view of its customers by common address. Prizm adds the lifestyle component. When the two are combined, Evans says, the result is a more insightful profile of current customers.

Campbell's Nelson *says modeling gives a good guess*

Tailored fit

In addition to better targeting of existing offerings, the bank uses the information gleaned from these systems to tailor products and services. "For example, last year, savings accounts were losing deposits," Evans says. "When we surveyed customers, we saw that they were opening money market accounts. So we developed a special money market account and targeted it to those people. Within a year, we brought in $200 million in deposits."

But the most dramatic use of segmentation data, according to Evans, is in site selection for new bank branches. "Clustering identifies market areas where we want to put in new branches," he says.

Finding new customers for existing products is crucial to business health, but launching new products is equally vital. Introducing a new brand is risky business: It's more expensive than merely extending an existing line, and it charts unknown territory. The potential for failure is great — as are the potential rewards.

"The road to success is new products — not line extensions, new flavors or new packaging," says Steve Rubinow, director of decision support services at Quaker Oats Co. in Chicago. "New product development requires creative processing."

At many firms, creativity gets an assist from sophisticated modeling systems that combine consumer surveys and complex algorithms that help to clarify the go or no-go decision.

Quaker Oats' Rubinow *says success takes big, bold steps*

At Campbell Soup Co. in Camden, N.J., where 30% to 40% of sales volume is typically derived from new products, a modeling system called Estimating Sales Potential (ESP) from NPD Group, Inc. is used to estimate the potential market for new products. "By and large," says Dick Nelson, a director of market research services, the preliminary estimates yielded by models are "pretty accurate."

New products that Campbell has successfully launched after running them through the model gauntlet include Le Menu Light Style Dinners, introduced in 1986, and Souper Combos, microwaveable soup and sandwich combinations introduced in 1988.

The modeling procedures used by systems such as ESP are considered so secret that clients such as Campbell provide information to the vendors, who then run the models and provide the results. The service is expensive. For ESP, the cost is $50,000 to $100,000 for food and household products and $75,000 to $150,000 for drug products. Costs for another popular system, Bases from The Bases Group, range from $15,000 to $150,000 for one model run and related services.

Higher costs for failure

The alternatives, however, can be even more costly in terms of both investment and image. "If a product dies in public, it's an embarrassment," notes Ed Russell, who also serves as a director of market research services at Campbell. "Only R&D is risked inside."

Still, Russell notes that the sophisticated external modeling systems are too expensive to tap more than once per product, which still leaves a gap in terms of ongoing feasibility research. That's why he is developing data for a model of his own, using a Lotus Development Corp. 1-2-3 spreadsheet and his Intel Corp. 80386-based PC. "It's a simple and straightforward design to use distribution and sales numbers from syndicated data to make Year-1 projections," he says. Although Russell's model won't be as sophisticated as ESP and Bases, it will be a valuable adjunct to those options. "We can run it early and often," he says.

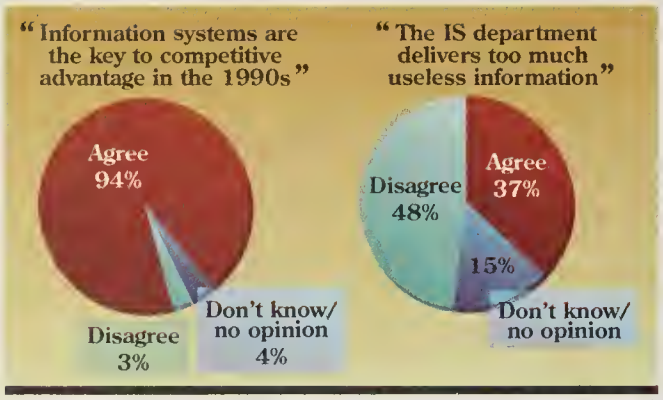
Baby-food maker Gerber Products Co. in Fremont, Mich., uses Bases to identify potential new hits and misses. New product development at Gerber is a systematic process, says Joaquin Pericas, director of market research. "From perhaps 10 to 15 new product ideas, we'll narrow our focus to three or four. Then we develop prototypes and do product-use tests," he explains.

Bases uses both a sophisticated algorithm and many inputs to gauge consumer response to a proposed new product. First, a test simulation is done. The proposed product is sampled by 500 consumers. "Those who say they would buy the product get sent home to use it for 10 days," Pericas explains.

All the consumers' responses are fed into the modeling systems, as are concept

Unsure if what they need is what they get

Sales and marketing managers say they believe that information systems are vital to their companies' strategies, but many are not sure if the data they get from IS is entirely relevant



Source: CW Survey

CW Chart: Paul Mock

Facts don't replace instincts

Before the advent of information systems to help analyze and screen vast amounts of data, market researchers depended on a blend of customer knowledge, surveys, intuition and old-fashioned "people sense" to forecast which products consumers would crave next. Even the most advanced hardware and software cannot fully supplant those skills.

As market researchers attest, divining the heart of the American consumer is still a very "soft" science indeed. Knowing when to stop looking at the numbers and start listening to instinct is crucial.

"Market research is a soft process," says Steve Rubinow at Quaker Oats Co. "It's very hard to put rules around it and systematize it."

And there will come a point when it pays to stop trying. "This is not an exact science," echoes Paula Tarvenia at Buick. "A lot of intuition goes into the mix."

"We spend a lot on consumer research. We don't want to lose touch with individual consumers through computers," says Ed Russell at Campbell Soup Co. "The more technology there is, the more people yearn for human contact and the more it's necessary from a business point of view."

Once in touch with consumer trends, fathoming consumer thinking is still mind-boggling. "I don't care how much data you have in front of you, people aren't logical," says Tim Evans at Perpetual Savings Bank. "We've got savings accounts that offer 8% interest, and people still put their money in 5¼% passbook accounts. The more I know, the less logic I see."

Don't count on logic

The problem is that when it comes to customer needs and wants, A plus B rarely equals C. "Increasingly, the study of yesterday and today doesn't reveal the actuality of tomorrow," says Graham Denton, chief executive officer at Product Initiatives, a Toronto-based new products consultancy. "Analysis doesn't reveal what will be successful because in most markets, there is a high degree of fragmentation and competition. The challenge must be approached by more innovative thinking," he says.

This is where many market researchers — replete with data — fall down, Denton claims. "Most market researchers, especially North Americans, are bean counters and trend plotters. They tend to be linear thinkers," he says.

The solution? Information systems married to creativity. "Knowledge serves as the foundation for the creative process, which means looking at the data in different ways," Denton says. "There are new ways of interpreting data, but you need to know enough about your market to know whether an idea is good or not."

Where, then, should market researchers draw the line between their use of IS and the creative process? "Where you have enough information to come up with a good creative idea," Denton advises. But, he cautions, even this approach isn't foolproof. Beware of the idea that hinges on changes in consumer behavior or attitude. "No good idea, however creative, will change how people behave or think."

BARBARA FRANCETT

and usage measurements as well as marketing plan inputs such as distribution levels and promotion spending.

The model projects such fundamental information as Year-1 sales as well as concept and product diagnostics. "If the product didn't perform well, [the model] tells us why. We can pinpoint where the problems are — if the color's too dark or the texture's too soft," Pericas says.

The firm also makes use of Nielsen data, although only in hard copy at the moment. Planning is under way for an online link that would give marketers terminal access to point-of-sale data.

At Gerber and many other firms, the relationship between IS and market research is friendly but limited.

"When we look at a new system, IS will be involved in the initial stages of introduction," Pericas says. IS makes the recommendations for hardware and software. "They'll come out with a proposal. Once the system is running, we do the rest."

John Hancock's Vanecko *sees vendors playing a big role*

But according to John Kraley, Gerber's MIS director, marketing will be seeing more of IS before long. "We have an excellent working relationship with the marketing groups, and we have plans to further automate them," he says. For example, a project is now in the feasibility stage for designing and populating databases to be accessed by Metaphor, an icon-driven marketing analysis package from Metaphor Computer Systems, which runs on top of IBM's DB2 relational database.

Although the IS department at Campbell helps load the syndicated databases obtained from vendors such as IRI and Nielsen and aids in tasks such as local-area network installation, the market research group creates and maintains its test, sales analysis and historical databases itself, looking to its vendors for programming expertise, Nelson says.

James Vanecko, director of consumer marketing at John Hancock Financial Services in Boston, also sees vendors filling most of marketing's needs. "Product marketers look for specialized vendors that do what they do well," he says. "Internal IS are operations people. Traditional approaches are not appropriate."

Using PCs, marketers at John Hancock download information from the corporate customer database, which is monitored by IS, into Harte Hanke's PCIS, which allows them to do English-language queries on the data. Geodemographic information is blended with customer information via a PCIS interface with Equifax Marketing Decision Systems' Infomart system. The integrated approach allows marketers to better analyze the features and benefits of new products, Vanecko says.

Get it together

Integration is, however, one area where, at most firms, IS has plenty of room to expand its involvement with marketing systems. Integration of internal and external data resources is the next major push for many forward-thinking companies.

"We work closely with IS, but it depends upon what we're doing," Cadbury Beverages' Nyce says. "One of our challenges is that the systems and data we use are out of house. The big issue right now is when or if to bring them in-house."

At Ocean Spray, Tarsa is even more definitive about the need for integration. "The next step in leveraging all the data at our disposal is to integrate the information in our databases," he says. That process has already begun, with the integration of grocery store sales data, picked up by IRI's Infoscan, and shipment data.

Quaker Oats' Rubinow, who reports to the vice-president of IS, is moving ahead with an IS plan designed to give marketing the broadest picture. "We're trying to incorporate external and internal data sources with other factors," he says.

"The spokes of the wheel are marketing, financial, sales, manufacturing and logistics," he continues. "Marketing includes external data, such as scanner, demographic, consumer, advertising and promotion data. All come from various sources, and there are integration issues we need to match up."

The combination of internal and external databases will present Rubinow with many different file formats and data languages. "That's the biggest problem," he says. "We have to understand each barrier." As a result, the project will evolve slowly, one area at a time, Rubinow says, and then they'll link them up.

At Gerber, Pericas says a closer working relationship between IS and marketing is possible. "The oppportunities are tremendous," he says. "But you need people with technical capability and marketing skills. That's why the two don't mix more often. MIS tends to be very technical. They need to see the broader picture. And marketing needs to better articulate what it needs." •

Keeping your head above water with AI and supercomputers

Data proliferation is both a blessing and a curse in the minds of many marketing professionals, for whom the fear of drowning is a common sensation. "There's so much data you can't keep up with it," Campbell Soup Co.'s Ed Russell says. "We have more analysts, but we're just as far behind. It just multiplies."

New approaches and new technologies are emerging, however, which may serve as water wings for the data-inundated, helping marketers to channel their search and analysis efforts more effectively and crunch information more efficiently.

Benn Konsynski, a visiting professor at Harvard Business School in Cambridge, Mass., sees embedded artificial intelligence as the key to effective "environmental scanning." By identifying and monitoring key indicators such as advertising initiatives, buyer conditions and affinity products, companies can stay a step or two ahead of market conditions, Konsynski says.

However, there is a catch. An adaptive and sophisticated search mechanism is needed to pinpoint those kinds of market changes and that, Konsynski says, probably means AI. "More and more, AI is being incorporated into these systems. The key is to minimize false positives and negatives," he says.

A related approach, "data refining," is gathering adherents among some far-seeing firms, says John Clippinger, director of the multimedia text technical group at Coopers & Lybrand's Advanced Technology Group in Boston. This approach weds data from internal databases as well as internal and external systems to better identify market opportunities.

To consolidate these enormous, often untidy databases and relate their information, some companies will soon be using very high-performance supercomputers, such as those provided by Cambridge, Mass.-based Thinking Machines Corp., Clippinger says. "This is becoming more and more feasible now. The computing power is available as is the storage capacity."

That fact has not escaped the notice of Thinking Machines, which is currently experimenting with software capable of improvisational grouping of customer records. "If you predefine market segments, most computers are pretty efficient at deciding which bucket to put them into," says Jim Bailey, director of marketing.

But more accurate profiles might be created by the ability to tell the computer to find categories without prior criteria. "First, it will randomly pair records and decide if they're similar," Bailey says. "Gradually, larger and larger groupings will evolve."

BARBARA FRANCETT

Baseline: The census

The common denominator for the demographic and segmentation systems that market researchers consider so essential for targeting new markets and new product opportunities is none other than the national census. By all accounts, the standard of the decennial Census of Population and Housing will rise to even loftier heights over the next decade as information of unprecedented breadth and depth emerges from the 1990 count.

"All data starts with the census. It's the only true national base of information," says Eric Cohen, director of the Marketing Information Products Division at CACI Marketing Services in Fairfax, Va. CACI provides demographic information in a variety of formats — such as age by income, age by sex, in a housing profile, in an Hispanic profile — including a clustering system called the Automated Classification of Residential Neighborhoods, or Acorn. Acorn uses 49 variables to group people into 44 homogeneous groups.

Beginning next year, 1990 census data — including the long-awaited summary tape files — will be delivered during the following three years, Cohen says.

"The [summary tape files] are the 'good stuff,' such as age, income, housing and education," he explains. The tape files offer greater subject detail than that found in the printed reports the government offers. The first summary tapes, which will be released on a state-by-state basis, are expected to be available to the public by mid-1991. For the first time, census information will be available on CD-ROM as well as computer tapes.

Market researchers can also look forward to using updated files from the Census Bureau's Topologically Integrated Geographical Encoding and Referencing, or Tiger, System, a digital map-based file containing detailed geographical data from which the bureau produces maps of the U.S.

"This is exciting because it's never existed before," Cohen says. "It takes every geographic area boundary and digitally encodes it onto tape."

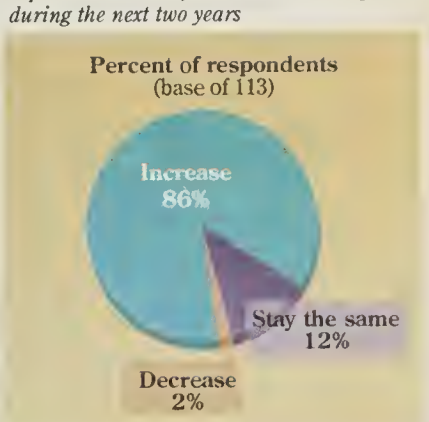
Tiger is a breakthrough, Cohen says. "Everybody will be working with the same information. It breaks the country down much more minutely than ever before. The entire country will be broken down into blocks, the smallest areas for which data is produced, whereas in the 1980 census, large rural areas were unblocked. This means the data can be used to target customers more accurately."

BARBARA FRANCETT

•

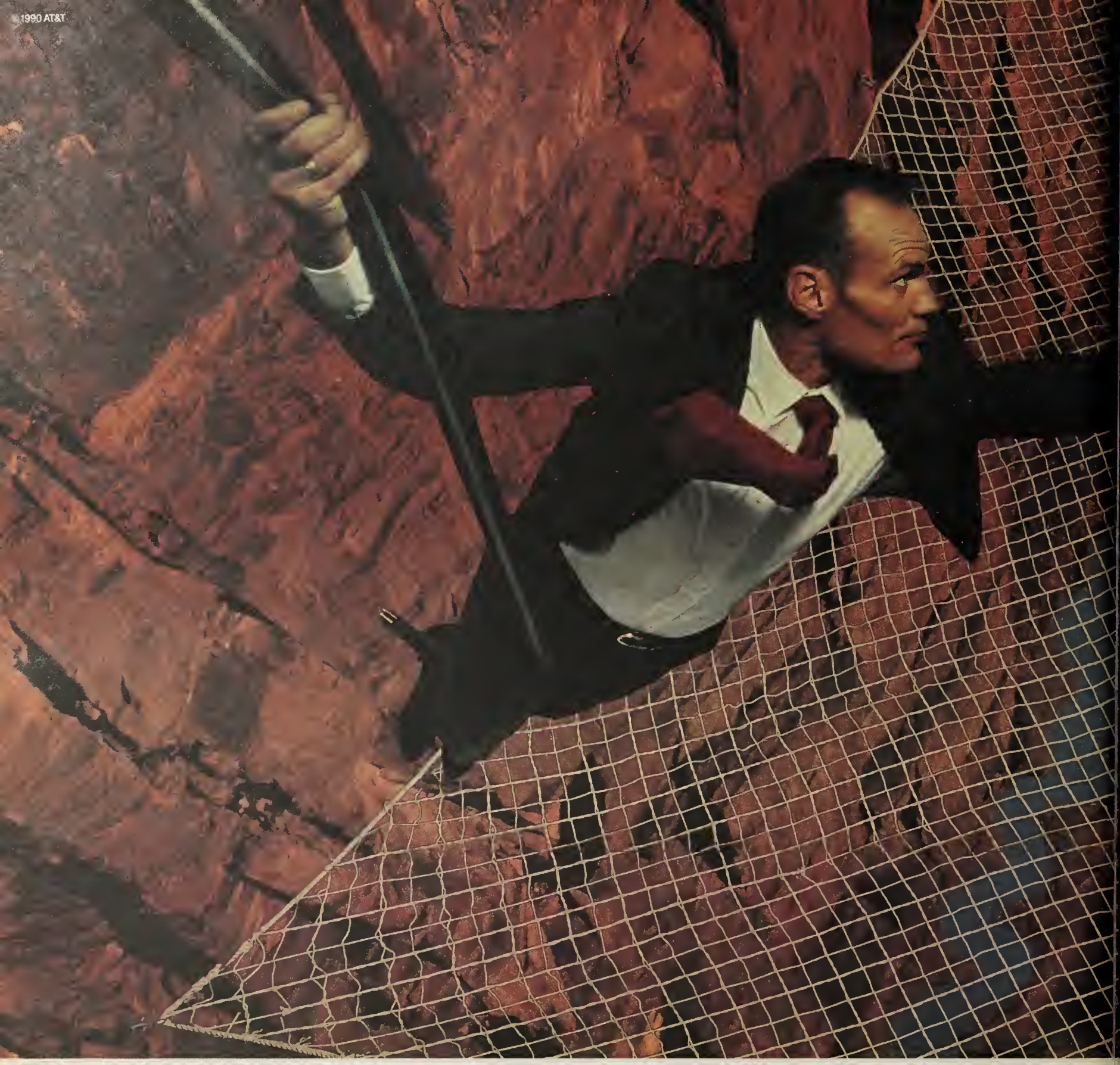
Pump up the volume

Sales and marketing executives say their departments' need for IS services will grow during the next two years



Source: CW Survey CW Chart: Paul Mock

©1990 AT&T



AT&T ACCUNET® T1.5. It's as

When it comes to T1.5, a lot of people take it for granted that a pipe is a pipe is a pipe. But the fact is that no other provider offers a safety net like the one you get with AT&T's ACCUNET T1.5.

Just how much more reliable is ACCUNET T1.5? Our monitoring and maintenance are so advanced, we actually set the standards for high performance in the industry.

And if there is a problem with one of our lines, we give you more ways to get your traffic out of harm's way. With over 60,000 digital miles and more than 450 points of presence, our routing diversity capability far surpasses that of our competition.

With ACCUNET T1.5, you can also get built-in, end-to-end protection features* that automatically switch your traffic to a backup channel in the event that one of your lines degrades.

We have so much confidence in the reliability and performance of ACCUNET T1.5 that we're willing to offer it with a guarantee. And that's something else you

*Network Protection Capability option not available in all locations.

close as you can get to risk-free.

can't get anywhere else.

So look before you leap into T1.5. You could save your company a lot of downtime.

Reliability.
Another AT&T advantage.

For more information about ACCUNET T1.5 and ACCUNET network management products, call your AT&T Account Executive or 1 800 247-1212, Ext. 149.

AT&T
The right choice.

Cutting back costly shelf tests

Marketers add systems to repertoire to help reduce time, costs

BY SUSAN KERR

Jello-O Pudding Pops looked like a winner of a product when Michael Duffy and his fellow managers at General Foods Co. first ran a computer simulation to test its potential. But there was no way the company was going to release the product without first getting confirmation from actual test marketing. "We didn't trust the numbers, so we also did test marketing," Duffy says, who today is a marketing manager at A. C. Nielsen Co. in Northbrook, Ill.

What General Foods used to come up with its initial projection on Pudding Pops was a simulation program from Hendry Corp. The program ran on a mainframe and combined a mathematical theory of marketing with what Duffy calls "concept of market structure."

The firm tried to build a hierarchical model similar to an organization chart. The tricky part, Duffy says, was trying to use equations based on assumptions to describe the market. In part, this entailed making assumptions about product preferences and then trying to quantify and represent the changeability of those preferences and what factors, such as coupon offers, were most likely to effect a change.

As it turned out, full-blown test marketing of Pudding Pops confirmed the outcome of the simulation — the frozen dessert had all the earmarks of a hit.

This kind of on-target analysis of product prospects is making computers a much more integral part of major marketing decisions at large consumer-goods companies. Even so, Duffy says, few companies are ready to entrust information systems with the full weight of a product introduction decision. It's a question of confidence, he explains: "There's nothing there that I can really sink my teeth into as to why [the numbers] are right. I can believe it when I talk to 350 people, and they tell me why they like a product."

> "THE OLD DAYS of running a test market in Peoria for a year are over."
>
> JOHN D. C. LITTLE
> MIT

Nevertheless, computer-driven modeling and simulation is taking on greater importance as time becomes an increasingly precious commodity.

Changes in the marketplace and in the distribution chain have brought a greater emphasis on speed and efficiency in product testing. Life cycles of products are shortening because competitors are becoming increasingly adept at copying successful ideas. An adjunct to this is that being first in the market traditionally translates into better sales than the me-too products.

"The old days of running a test market in Peoria for a year are over," says John D. C. Little, a professor at MIT's Sloan School of Management in Cambridge, Mass. "In the year it would take [to run a test market], competitors would put on a crash program and start a rollout of their own."

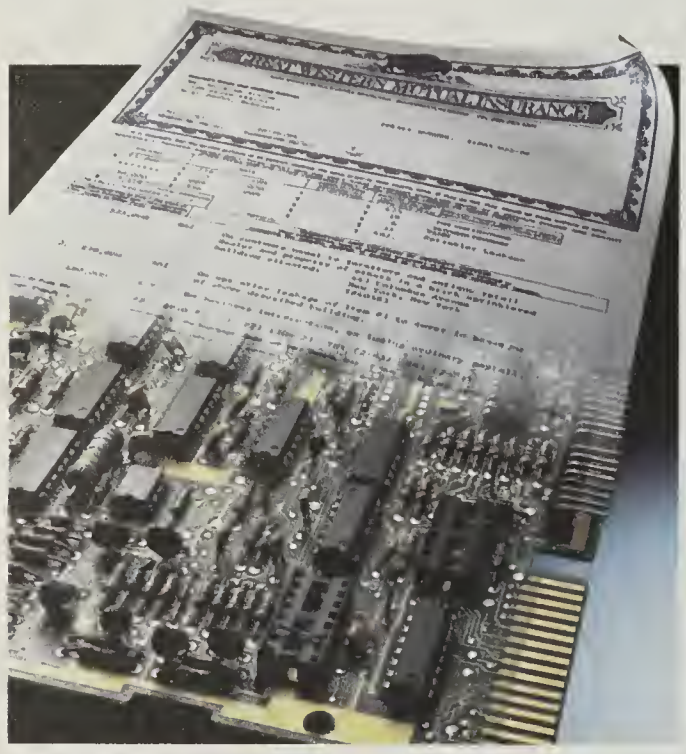
From art to science

Some technology-driven services have emerged in the last decade that claim to make test marketing a more precise science, capable of producing better and faster answers.

One is a service called Behaviorscan, run by Chicago-based Information Resources, Inc. (IRI). IRI has carefully profiled approximately 3,500 participants in each of six small cities and given them identification cards. These cards are scanned

Continued on page 104

© Eastman Kodak Company, 1990



Capturing document images—and managing their information electronically—can bring efficiency and economy to your archival or time-sensitive document records.

Whatever the size of your organization, Kodak Imagelink equipment and software can simply, cost-effectively capture a paper image on microfilm and/or optical and/or magnetic media. Then you can interact with that image in much the same way you do with data. A few keystrokes and the document you need appears on screen, complete with marginal notes, endorsements, diagrams and signatures. In a totally integrated information environment, an image can then be printed, faxed, distributed over a network, or even used for response by phone.

We have more than 60 years of business imaging experience to share. Ask your KODAK Business Imaging Systems representative how image management can benefit your information management. ***Call 1 800 445-6325, Ext. 330.***

CAPTURE THE IMAGE. CALL KODAK

The new vision of Kodak

Kodak

In a world that changes economic systems overnight, can we really afford personal computer systems that take weeks to set up, months to learn, and years to deliver on their promises?

No. But, fortunately, afford a

In the 1980s, American companies invested $90 billion in PCs, yet office productivity has shown disappointing gains.

Not everybody was disappointed, however.

According to a new independent study by Diagnostic Research, Inc.*, companies that invested in Macintosh® computers are enjoying dramatic results. IS managers gave Macintosh productivity ratings that were 37% higher than for MS-DOS systems and 32% higher than for PCs running Windows.

Which is like getting back 17 extra weeks a year.

In a global economy of snowballing competition, the story behind those figures may be of interest.

In 1984, Apple introduced Macintosh on the simple premise that computers should work the way people do.

Now, as others rush to market with Macintosh look-alikes, Apple turns out to have been the practical, results-oriented computer company all along.

Introducing a new series of Macintosh computers from $999.†

Our three new personal computers were designed to rectify the one flaw that still exists in Macintosh. Namely, some people still don't have one. So now, starting at $999,† there is a Macintosh at a price that almost everyone can afford.

The Macintosh Classic.

The Macintosh Classic® has everything that makes a Macintosh a Macintosh. Built-in networking. A SuperDrive™ disk drive, which reads both Macintosh and MS-DOS files.

And a $999† price that includes the built-in monitor, 1MB of RAM, keyboard, mouse, and system software.

A 40MB hard disk is optional.

Its processor is an 8 MHz 68000 chip. And it outperforms even its popular predecessor, the Macintosh SE.

The new Macintosh Classic, Macintosh IIsi, and

** The figures are included in a 1990 study conducted by Diagnostic Research, Inc., among Fortune 1000 managers and business computer users familiar with Macintosh and MS-DOS or Windows systems. Call and we'll send you*

Macintosh, and "The power to be your best" are registered trademarks, and SuperDrive is a trademark of Apple Computer, Inc. MS-DOS and Windows are registered trademarks of Microsoft

now everybody can Macintosh.

cintosh LC on stage together for the very first time.

The Macintosh LC.

The new, low-cost Macintosh LC introduces the exquisite quality of Macintosh color and graphics to a new, wider world.

With its 16 MHz 68020 processor, it runs all the thousands of Macintosh programs at impressive speed. And, with an optional Apple® IIe Card, runs thousands more Apple II applications as well.

The Macintosh LC expands by adding a card to its standard slot. A 40MB internal hard drive is standard.

A built-in video chip runs either an Apple monochrome or low-cost color monitor—without adding a video card. And the Macintosh LC, like the Mac® IIsi, even lets you record your voice and other sounds into the computer. Which will soon make voice-annotated software a standard Macintosh feature.

The Macintosh IIsi.

Running a 20 MHz 68030 microprocessor, the Macintosh IIsi delivers serious number-crunching at the most attractive possible price. Into its sleek package are compressed all the powerful essentials of the Mac II line. Including an optional 32-bit NuBus™ slot supporting high-performance graphics and accelerator cards.

Along with advanced networking systems like Ethernet and Token-Ring. Plus a 40 or 80MB hard drive.

Built-in video chips drive four different Apple monitors.

Why the least expensive Macintosh is more powerful than the most expensive anything else.

Every Macintosh, from the original to the latest, shares a compelling quality unavailable in any other PC at any cost: People really like using it. What they like to do, they do. And so they get more done. Call us at 800-538-9696, ext. 350, for your nearest authorized Apple reseller. You'll find an amazing thing happens when you give people the power to be their best. They'll be it.

The power to be your best.

summary: Fortune 1000 refers to Fortune 500 and Fortune Service 500, which are trademarks of The Time Inc. Magazine Company. ' Manufacturer's suggested retail price. © 1990 Apple Computer, Inc. Apple, the Apple logo, Mac, rporation. NuBus is a trademark of Texas Instruments, Inc. Ethernet is a registered trademark of Xerox Corporation. Classic is a registered trademark used under license by Apple Computer, Inc

Marketing is sold, but not satisfied

BY CAROL A. COULTAS

When it comes to information systems, marketing directors make savvy, demanding consumers.

"We've got to find some way to slice and dice the tremendous amount of information out there," says Michael Patrick, senior manager of market analysis at S. C. Johnson and Son, Inc., the makers of Johnson Wax products, in Racine, Wis. "The ideal system would allow us to do the filtering of information and then to format and graph it in such a way that our marketing decisions are made obvious."

James McCarter, director of marketing at Freedom Forge Corp., a steel company in Burnham, Pa., has his own ideas about an ideal system — born mostly out of frustration with his current data retrieval system, which he says is inflexible and not user-friendly.

"I hate it," he says. "If someone were to ask me what our sales are like in the Chicago area, I would have to go in and start sorting data from the Chicago area. It could be done, but it would take a lot of time to do it."

Tailor to fit

Although James Morgan, senior vice-president of planning at Philip Morris U.S.A. in New York, says that he's very satisfied with his company's current marketing information system, the variety of software capabilities can seem daunting. "It's well presented," he explains, "but when you deal with sales figures, there are 87 different ways to present the data. That's a living experiment. We just keep tweaking the system."

Tailoring information systems to marketing needs, which are both very specific and very changeable, is an ongoing challenge — but one that is key in maintaining a competitive edge, according to marketing executives.

Philip Morris' Morgan *considers marketing a 'living experiment'*

McCarter, for example, notes that his company is making improvements in systems for forecasting and reporting a major goal for 1991, particularly in the sales and marketing departments. "We're getting our customer files better organized," McCarter says. "Right now, forecasting is a little like Johnny Carson playing Carnac. Once we're better organized, we expect a higher degree of accuracy."

Patrick envisions a system that would allow S. C. Johnson to track not only its own products but also those of competitors or potential competitors. To illustrate his point, he uses a hypothetical situation in which his company makes razor blades but wants a system that provides data on men's skin treatment products — shave creams, colognes and hand and body lotions.

"Some categories, such as hand and body lotions, may be growing at a higher rate than others," Patrick explains. "And we'd want to look at segments within those categories, such as dry skin products. There may be an opportunity to supply a product of our own that meets a consumer need."

McCarter also believes that having access to information about his firm's competitors would provide Freedom Forge with an important edge in the marketplace.

"If you have information that shows a competitor's customer gets a product in eight weeks, and your lead time is 12 weeks for the same product, that's a pretty valuable piece of information," he says.

At K Mart Corp., information about competitors is integrated with demographics to help form a basis for making marketing decisions, according to Ron Gellish, general manager for corporate research and planning at the Troy, Mich.-based retailer.

"We maintain a database of our competitors' information so we can identify where our competitors are opening and closing units," Gellish says. "We use that information to analyze the impact on our business."

Gellish acknowledges that K Mart's information system is already fairly comprehensive but says that it still doesn't provide one particularly useful marketing tool — the actual demographics of the firm's customer; that is, who bought what item and at what price.

"We can look at a demographic area and see that within a five-mile radius around a certain store, the population is 90% white and 10% black and get an income profile and the number of kids," he explains. "But it's a leap of faith to say those are the people who are bringing all those widgets through the registers."

Joyce Ravid

S. C. Johnson's Patrick *needs a way to prioritize and segment market data*

Gellish notes that a retailer such as Sears, Roebuck and Co. can get that sort of information by analyzing customers' department credit-card use. Lacking its own credit card, K Mart relies instead on demographics and external market research companies such as A. C. Nielsen Co.

"If Nielsen says, according to its database, K Mart has 10% of the market for records, tapes and compact discs, then we'll look at our own sales data and see if there are areas where we fall below or far above the market," Gellish explains.

Nielsen is also providing information in hard copy from thousands of household "panels" who keep diaries to record purchasing patterns. K Mart is exploring the possibility of establishing an electronic linkup with the Nielsen panels to make that information more accessible.

They see the edge

Although marketing managers are not always perfectly satisfied with the information systems in place to support them, they don't underestimate what computer technology has done and can do to advance their companies' marketing efforts.

Several marketing directors contacted by *Computerworld* refused to discuss their use of IS, saying they were fearful of revealing strategies to their competitors.

Furthermore, in a *Computerworld* survey conducted earlier this year, 85% of the managers in user departments — including sales and marketing — agreed that information systems are the key to competitive advantage in the 1990s. •

Coultas is a free-lance writer in South Harpswell, Maine.

Continued from page 100

at each grocery store visit, thus supplying IRI with an accurate list of purchases. IRI has run 20 to 25 tests in each Behaviorscan market. More than half have been new product tests.

Part of Behaviorscan's appeal is its ability to monitor each participating family's cable television viewership and direct different advertisements at individual homes. IRI then shows the affect of different marketing strategies for new products.

A test using Behaviorscan costs anywhere from $50,000 to $300,000, not including advertising, according to Bob Bregenzer, an IRI senior vice-president.

Scanner strategy

Recently, Nielsen embarked on a different technology strategy by providing 15,000 households across the country with their own handheld scanners. After returning from a shopping trip, a household member scans all the Universal Product Codes of purchased items. Once every few weeks, he calls up Nielsen and downloads the scanner information by phone lines to Nielsen's IBM mainframe. As part of their total test marketing strategy, this gives manufacturers a more geographically dispersed picture of what types of people buy particular products.

Mall interviews have long been a staple of market research and a fast means of getting some reliable information on product potential without resorting to an actual shelf test. Here, too, computers are beginning to play a bigger role. Mall testing typically works by having researchers go into selected shopping arcades and ask several hundred people what product characteristics they'd like or show them real products and get their views. In some cases, shoppers are sent home to use the new item and are called later for their opinions.

Answers gathered by researchers always eventually wind up being fed into a computer for analysis. What's new is that personal computers are now being placed on-site at the malls. This summer, The Bases Group in Cincinnati started equipping its interviewers with PCs. Previously, paper responses were shipped to Bases and keypunched, according to operations vice-president Christine Adams. Now, project time has been cut in half by having either the disks mailed or data downloaded via modem to Digital Equipment Corp. VAXs. Adams adds, "We believe we'll save significant money once [the systems are] up and running." The savings should come from reducing or eliminating printing costs, shipping costs and the double checking of numbers, she says.

Duffy *says computers helped Pudding Pops lick the market*

Consumer responses

Another approach tried by some companies is to allow the consumers to key in their own computer responses. Several marketers say they believe this approach is less fruitful, however, because interviewers are more adept at flushing out good information from respondents.

Interactive PC graphics will soon allow manufacturers to test concepts more easily without the product in hand, says Rashi Glazer, assistant professor at the University of California at Berkeley's Walter A. Haas School of Business. In another year, he predicts, potential consumers will be shown computer-based images of products from which they can pick out features they like. This would save companies the time and money of making real mock-ups or prototypes.

In the meantime, others are working on different ways to attack statistical modeling. Little, for example, is reassembling old test data to answer questions such as: If the price were different, would the product do better? Using data models collected over three years on the buying habits of specific households, he is constructing models that will attempt to help predict the best way to introduce products in the future.

Test marketing, in the sense of controlled introductions of products in selected and measurable markets, will probably never be totally replaced. As Glazer notes, "The cost of being wrong is so much more expensive than test marketing."

There is, however, little doubt that in the future, computers will have a bigger say — not only in what gets to store shelves, but also what products should be subjected to good old-fashioned test marketing. •

Kerr is a free-lance writer in Los Altos, Calif.

IBM's most popular secret.

SQL/DS

ALTHOUGH SQL/DS IS installed on over 7,500 computers, some people think of it as IBM's "other DBMS" and as a junior partner to DB2.™

In fact SQL/DS, like DB2, OS/2® Extended Edition Database Manager and OS/400® Database Manager, is a critical part of SAA™ and an outstanding relational database management system in its own right. Introduced in 1981 for VSE and in 1983 for VM, SQL/DS was the first commercial relational DBMS for IBM mainframes. Over the years, it has matured through three major versions. Consequently, SQL/DS has the industrial-strength features and high performance that have led numerous businesses—including manufacturers, newspapers, shipbuilders, hospitals and universities—to run their mission-critical applications with it. These customers have applications with large transaction volumes, or large databases having tables of over 70 million rows and hundreds of views, or thousands of users.

Let's take a look at what makes SQL/DS Version 3 the best DBMS for users of the VM and VSE operating systems.

Standards

In addition to the high performance and robust features that serious database applications require, SQL/DS has three features that are essential to implementing the most important information architecture of this decade—distributed computing. These features work together to provide an excellent environment for implementing distributed applications.

The first feature is SQL/DS's adherence to international standards for SQL as expressed by the American National Standards Institute (ANSI), the International Standards Organization (ISO) and the Federal Information Processing Standard (FIPS) 127.1. FIPS has created a test suite so vendors can measure how close they come to the SQL specification. Version 3 Release 2 of SQL/DS easily passes this test. SQL/DS even provides a "FIPS flagger" program to help users identify SQL statements failing to comply with the FIPS standard.

The second important feature is SQL/DS's participation in SAA connectivity using Advanced Program to Program Communication (APPC). This communication standard simplifies building cooperative processing applications with SQL/DS. In particular, APPC makes it easy to use SQL/DS as a database server in client server applications. In this style of distributed computing, the DBMS provides intelligent access to the data for client applications running on remote computers. These remote computers can be other mainframes, but more and more they are PCs with a graphical user interface such as OS/2 Presentation Manager.™

Not only do IBM's applications such as QMF use SQL/DS as a server, but third-party products are being used as front ends to SQL/DS to build applications. Independent software vendors are also attracted by the large installed base of SQL/DS users.

Distributed Data Bases

The third feature needed for effective distributed processing is support for distributed databases: the ability to access data at multiple sites, including locally, in a transparent fashion. One benefit of a distributed database is that local data can be retrieved without any network activity, thus reducing communications costs when compared with a centralized database at a single remote site. Another potential advantage is that each database node can be appropriately sized to the amount of data, the complexity of user requirements and the number of users. As the system grows, added demand can be met more easily than with a centralized system, by making smaller changes to existing nodes or by adding new nodes to the network.

SQL/DS's "remote unit of work" capability delivers these benefits by allowing a collection of database operations (called a unit of work) to retrieve and update data at a remote site. Future releases of SQL/DS will add support for "distributed unit of work," which allows a single unit of work to access data at multiple sites simultaneously.

Connectivity

Because companies often rely on a variety of operating environments, IBM is committed to extending distributed database functionality. Currently, remote data can be shared among VM SQL/DS databases, and IBM has announced data sharing between VM SQL/DS and DB2 databases. VSE Guest Sharing, using VM TSAF, provides access to local or remote VM SQL/DS databases to VSE users and applications running under VM. IBM intends to add interoperability with AIX,® OS/2 and OS/400 applications and databases as well.

SQL/DS delivers the three keys to implementing distributed processing—SQL standards, SAA connectivity and distributed databases. If you need to solve tough data management problems in a VM or VSE environment, SQL/DS is the obvious choice. Get in on the secret.

IBM®

© 1990 IBM Corporation IBM, OS/2, OS/400 and AIX are registered trademarks and DB2, SAA, QMF and OS/2 Presentation Manager are trademarks of IBM Corp

PRODUCTIVE.

Sterling Software has been making businesses more productive for years. With products that have a well deserved reputation for quality, reliability, ease of use, and support. Products which have been industry standards year after year, with more than 32,000 installations worldwide.

We're committed to providing the products and strategic support you need to improve the productivity of your entire organization. Today. And tomorrow.

For more information, contact Sterling Software.

STERLING SOFTWARE

THE FUTURE IS STERLING.

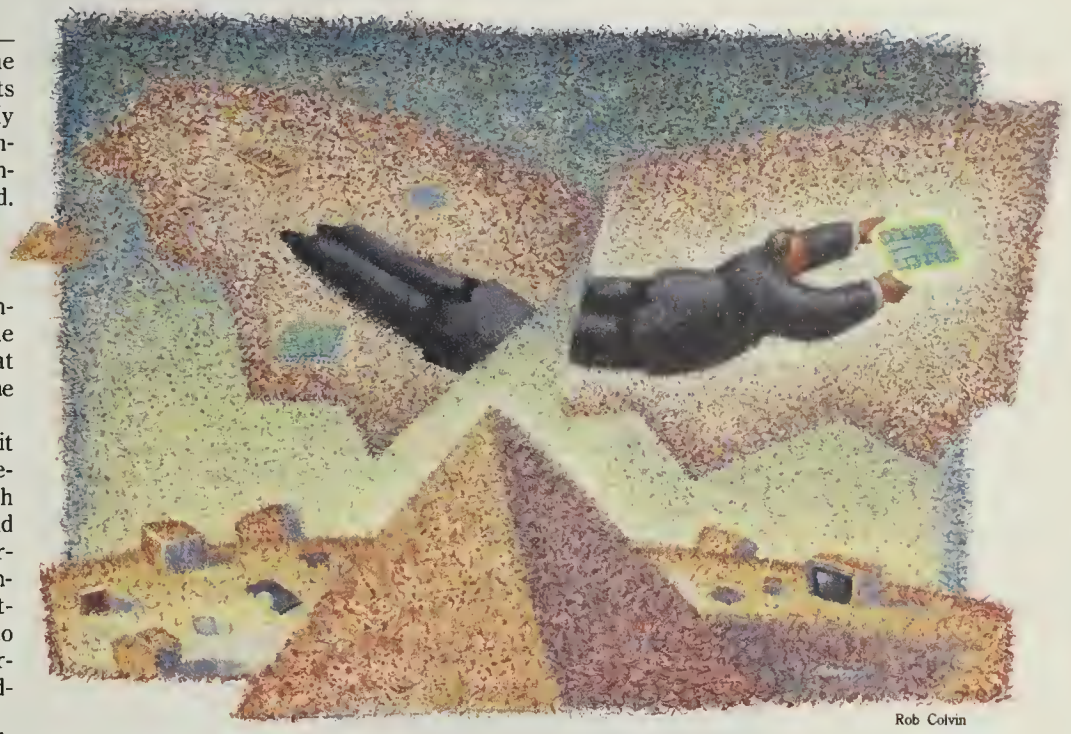
System Software Group Headquarters, 21050 Vanowen Street, Canoga Park, CA 91304, Phone (818) 716-1616

Answer Systems Division: (818) 716-1616 Dylakor Division: (818) 718-8877 International Division. (818) 716-1616
Software Labs Division. (714) 889-2663 Systems Software Marketing Division: (916) 635-5535
Zanthe Systems Division: (613) 727-1397

Cyberspace '90

Sci-fi writer William Gibson explores the final frontier: Information

BY WILLIAM GIBSON



Rob Colvin

I was born in 1948, in the late dawn of the Information Age. I knew environments in which there were no televisions. My childhood was strongly colored by rampant technological optimism and a concomitant undertone of abiding dread. The two poles of the mass imagination were a glittering futuropolis, slick as Johnson's Wax, and the shadows of the nuclear wasteland. I was constantly told by various authorities that the atom would change everything. (Somewhat later, if less officially, I was told the same thing about LSD.)

I saw the world then — much as I see it now — as the ultimate science-fiction scenario. But the science fiction I grew up with was about technology as its makers would have had us receive it. The future would arrive on a stainless platter, probably of Scandinavian design, to be instantly and obediently taken up by Americans of my generation to be, it went without saying, applied to the purpose for which its manufacturers had intended it.

The science fiction I grew up with was seldom about garbage. Nor was it often about the messy and fascinating uses the human animal finds for the things that arrive daily from the uncounted factories of a world that sometimes fancies itself post-industrial. But the stainless platter is gone, replaced by a stream of cardboard-backed bubble-packs. There is no particular end in sight, and the street, home to the messy human animal, persists in finding its own uses for things. (We have it on reliable authority that Colombia's cocaine barons employ expert systems to route the global flood of their product.)

My own science fiction has tended to be about garbage, the refuse of industrial society. We swim, after all (and sometimes sink) in a sea of the stuff. We also swim, some of us, in largely uncharted seas of information, sustaining the very monsters of my bread and butter: the outlaw hacker and the great big corporation. When I wrote *Neuromancer* in 1983, "hacker" had not yet acquired its current freight of negative value. Hackers were obsessive, superbright boffins who delighted in worming their way as far into the texture of the emerging data matrix as possible. In fact, they were sometimes the very same techie folk heroes who brainstormed the personal computer into being, and a few of them even managed to become Great (or at least Pretty) Big Corporations in the process. To hack, in the original sense, was not bad; to hack was to *be there.*

Be where? Cyberspace. Not the neural-jacked fantasy purveyed in those paperbacks of mine. Rather, in the altogether more crucial version of the concept as currently championed by John Perry Barlow, Mitch Kapor and the Electronic Frontier Foundation: The totality of information existing in the matrix *right now.* Because cyberspace, as I've been muttering for years, is already here. Or rather, we are already there and have been for some time.

> I SAW THE WORLD then — much as I see it now — as the ultimate science-fiction scenario.

This is difficult for some of us to see, likely because we're more used to technologies that open pre-existing territories. Cyberspace, in Barlow's sense, is a territory *generated* by technology. As such, the "territory" itself is subject to constant growth and permutation — a cybernetic Wyoming writhing in some eerie interstice between concept and silicon. Yet this territory is certainly real because we can be rousted by the Secret Service for crimes alleged to have been committed there.

The electronic frontier

And now, teetering on the brink of a new world order/chaos theory, apparently having arrived just in time to describe the global political situation, we are told that virtual reality technology is about to change everything. The video helmets and data gloves of virtual reality are our hot tickets to the future.

But the future has junkyards, where one day even the hottest machines must be left out in the rain to rust. All technology eventually gathers dust. What matters is territory, and in its generation of territory, the advanced technology of information is unique. The territory is there now, awaiting partition. Fascinating as the potentials of virtual reality may be, I'm more impressed by Kapor's metaphor of the electronic frontier.

Cyberspace today seems just that, a virtual frontier sparsely inhabited by technical pioneers — loners, visionaries and even outlaws — all of whom are willing to live off the land. Both the hacker and the corporation (let us include governments and military entities) have been aware of the territory, in some sense, from the beginning — the hacker, by nature of his being, and the corporation, by virtue of its need to define itself.

The first hackers were — in many instances and quite literally — creators of

---

Gibson is author of *Neuromancer, Count Zero, The Mona Lisa Overdrive* and *Burning Chrome.* He is a winner of the Hugo and Nebula Awards for science-fiction writing.

the territory they explored, and as such, they had a certain edge. But the railroad is no doubt on its way, in the form of the Great Big Corporation, and with it will come what my colleague Bruce Sterling has called the planned development of hyperreal estate. The proto-hackers of the 1970s may one day be remembered as cybernetic mountain men, the earliest settlers in a landscape long since dominated by data malls and information megamarts.

Or perhaps I'm merely being romantic; perhaps the mall, the dominant structure of our economy, is already firmly in place. In the data mall, the majority of users go about their business in the most ordinary way. Most, in fact, are as yet unaware of the mall itself and see only their own specific destinations and the functions they must perform there.

Amid these good and ordinary folk of Cyberia, however, there may sometimes be found exceptions: spies, vandals, voyeurs, terrorists, artists and combinations thereof.

But these others have one thing in common, if nothing else: They are aware that there *is* a mall. (Though our data mall currently differs from the concrete and glass model in one minor but perhaps crucial specific: Scattered amid the chain stores and fast-food franchises are meeting places of an almost European intimacy, nonprofit hangouts of hair-down boho splendor. These are bulletin boards, and our "other users" are prone to spend a good bit of time there.

Myself, I'll stick with garbage because my real business has less to do with predicting technological change than making evident its excesses. I'll stick with the poetry inherent in reels of magnetic wire recordings, rusting under a sun-faded card table at a California swap meet. We may not actually recall the machines required to summon voices from these brittle yards of steel, but there's an appealing melancholy in the fact that the vendor is unaware that these *are* recordings. All those voices. Other days, other days.

And one day our floppies will lie there by the millions, warping and gathering dust, not to mention that svelte laptop you've just decided on.

But meanwhile, I'd advise those of you so inclined to definitely go West. It's either El Dorado or a shopping mall — same as it ever was, somehow. •

Linz, Austria/ Vancouver, B.C.
September 1990

The Difference Engine

An excerpt from Gibson's and Bruce Sterling's new book gives glimpses of life in high-tech, 19th-century London

What if the Information Age had begun in the Victorian Era — and Charles Babbage perfected his mechanical computing engine before the development of electronics?

In their forthcoming novel, William Gibson and Bruce Sterling depict a London of 1855 that is both familiar and much changed. Steam-powered Babbage engines are run by an elite group of "clackers." Every man and woman has a government-issued number. Palentologist Edward Mallory's discoveries made him a sure bet to join the ruling savants.

"Do you like your work, Mr. Tobias?"

"Pay's not much. Gaslight ruins your eyes. But it has advantages." He shrugged again and pushed his way through another door into a clattering anteroom, three of its walls lined with shelves and card files, the fourth with fretted glass.

Behind the glass loomed a vast hall of towering engines — so many that at first Mallory thought the walls must surely be lined with mirrors, like a fancy ballroom. It was like some carnival deception, meant to trick the eye — the giant identical engines, clock-like constructions of intricately interlocking brass, big as railcars set on end, each on its foot-thick padded blocks. The whitewashed ceiling, thirty feet overhead, was alive with spinning pulley belts, the lesser gears drawing power from tremendous spoked flywheels on socketed iron columns. White-coated clackers, dwarfed by their machines, paced the spotless aisles. Their hair was swaddled in wrinkled white berets, their mouths and noses hidden behind squares of white gauze.

Alex Waterhouse-Hayward

Gibson: *Back to the future*

Tobias glanced at these majestic racks of gearage with absolute indifference. "All day starin' at little holes. No mistakes, either! Hit a key-punch wrong, and it's all the difference between a clergyman and an arsonist. Many's the poor innocent bastard ruined like that . . ."

The tick and sizzle of the monster clockwork muffled his words.

Two men, well-dressed and quiet, were engrossed in their work in the library. They bent together over a large square album of color plates. "Pray, have a seat," Tobias said.

Mallory seated himself at a library table, in a maple swivel chair mounted on rubber wheels, while Tobias selected a card file [and] retrieved a pair of cards. "Were these your requests, sir?"

"I filled out paper questionnaires. But you've put all that in engine-form, eh?"

"Well, QC took the requests," Tobias said, squinting. "But we had to route it to Criminal Anthropometry. This card's seen use — they've done a deal of sorting work already." He rose suddenly and fetched a loose-leaf notebook — a clacker's guide. He compared one of Mallory's cards with some ideal within the book with a look of distracted disdain. "Did you fill the forms out completely, sir?"

"I think so," Mallory hedged.

"Height of suspect," the boy mumbled, "reach . . . Length and width of left ear, left foot, left forearm, left forefinger."

"I supplied my best estimates," Mallory said. Tobias plucked up the cards, dropped them through a slot and pulled a bell rope. There was a sharp clanging. In a moment a clacker arrived for the cards.

"Now what?" Mallory said.

"We wait for it to spin through," the boy said.

"How long?"

"It always takes twice as long as you think," the boy said, settling back in his chair. "Even if you double your estimate. Something of a natural law."

■

Tobias lowered his voice. "Truth to tell, sir, you could pay a common magistrate, or even his clerk, and have this intelligence for a few shillings, under the rose. Once you've someone's number, the rest is simple enough. It's a common clacker trick to read the engine-files on someone of the criminal class — they call it 'pulling his string,' or being 'up on a cake.' "

Mallory found this news of remarkable interest. "Suppose I asked for my own file?" he said.

"Well, sir, you're a gentleman, not a criminal. You're not in the common police files. Your magistrates, and court clerks and such, would have to fill out forms and show good cause for the search. Which we grant easily."

"Legal protocols, eh?" Mallory said.

"No sir, it's not law that stops us but the simple trouble of it. Such a search consumes engine-time and money, and we're always over budget in both. But if an M.P. made that request, or a Lordship . . ."

"Suppose I had a good friend here in the Bureau," Mallory said. "Someone who admired me for my generous ways."

Tobias looked reluctant and a bit coy. "It ain't a simple matter sir. Every spinning-run is registered, and each request must have a sponsor. What we did today is done in Mr. Wakefield's name, so there'll be no trouble in that. But your friend would have to forge some sponsor's name, and run the risk of that imposture. It is fraud, sir. An engine fraud, like credit theft or stock fraud, and punished just the same, when it's found out."

"Very enlightening," Mallory said. "I've found that one always profits by talking to a technical man who truly knows his business. Let me give you my card."

Mallory extracted one of his Maull & Polyblank cartes-de-visite from his pocketbook. Folding a five-pound note, he pinched it against the back of his card and passed it over. It was a handsome sum. A deliberate investment.

Tobias dug about beneath his apron, found a greasy leather wallet, stuffed in Mallory's card and money and extracted a dog-eared bit of shiny pasteboard. J. J. TOBIAS, ESQ., the card said in grotesquely elaborate engine-Gothic. KINOTROPY AND THEATRE COLLECTIBLES. There was a Whitechapel address. "Never mind that telegraph number at the bottom," Tobias told him. "I had to stop renting it."

"Have you any interest in French kinotrophy, Mr. Tobias?" Mallory said.

"Oh, yes, sir," nodded Tobias. "Some lovely material is coming out to Montmartre these days."

"I understand the best French *ordinateurs* employ a special gauge of card."

"The Napoleon gauge," Tobias said readily. "Smaller cards of an artificial substance, which move very swiftly in the compilers. That speed is quite handy in kino-work."

"Do you know where a fellow might rent one of these French compilers here in London?"

"To translate data from French cards, sir?"

"Yes," Mallory said, feigning an only casual interest. "I expect to receive some data from a French colleague, involving a scientific controversy — rather abstruse but still a matter of some scholarly confidentiality. I prefer to examine it privately, at my own convenience."

"Yes, sir," Tobias said. "That is to say, I do know a fellow with a French compiler, and he'd let you do whatever you like with it if the pay were right. Last year, there was quite a mode in London clacking circles for the French standard. But sentiment has turned quite against it, what with the troubles of the Grand Napoleon."

"Really," Mallory said.

Tobias nodded, delighted to show his authority. "I believe it's felt now, sir, that the French were far ahead of themselves with their vast Napoleon project, and made something of a technical misstep!"

Mallory stroked his beard. "That wouldn't be British professional envy talking, I hope."

"Not at all, sir! It's common knowledge that the Grand Napoleon suffered some dire mishap early this year," Tobias assured him, "and the great engine has never spun quite properly since." He lowered his voice. "Some claim sabotage! Do you know that French term, *sabotage?* Comes from *'sabots,'* the wooden shoes worn by French workers. They can kick an engine half off its blocks!" Tobias grinned at this prospect, with a glee that rather disquieted Mallory. "The French have Luddite troubles of a sort, you see, sir, much as we once did, years ago!"

Used by arrangement with the authors from their forthcoming Bantam book to be published in March 1991.

Our man in cyberspace checks out virtual reality

Inside the goggles, you're a cartoon character for an hour

BY JIM NASH

It was like a dream, but electronic, like television. I was flying above a kitchen that I somehow knew was mine, though it resembled no room I had ever floated above. A big blue hand hung in front of my face and arthritically mimicked every movement of my own right hand.

I turned my head and saw that the room stood roofless and alone on a vast, unmarred plane. Hungry, I floated down to the kitchen floor and opened the white refrigerator. No peanut butter, cold chicken or beer. My head began to itch, and my eyes ached. This was becoming a nightmare. But even nightmares are usually more comfortable than this.

This was virtual reality — the sensual computer illusion forecast by William Gibson and other science-faction authors. In Gibson's books, this electronic hallucination is called cyberspace. In my book, it's like being a cartoon character for an hour.

In real reality, I am at VPL Research, Inc. in Redwood City, Calif., which invited me to try out its brand of faux life. As I strapped on a black Lycra data glove, looking like the world's oldest Nintendo player, Ann Lasko-Harville, VPL's director of product design, explained the basic idea:

Three sophisticated, interactive computer programs, written in Forth, C and Pascal, put users inside a world of computer graphics. This allows users to treat system-generated objects almost as if they were real physical things. You interact with the environment using special clothing and fiber-optic sensors that interpret body positions as computer commands. In theory, a user can create a world limited only by his imagination and programming capabilities.

> I GRINNED, ENJOYING the power, as I realized that I was lord of a completely artificial world that would react almost instantly to my presence.

As I slipped the goggles on, I noticed an ankle-to-wrist lycra jumpsuit on a hanger outside VPL's demonstration room. Complete with fiber-optic piping that looks like something June Lockhart wore to bed in *Lost in Space*, the garment, I learned, is a virtual reality suit. It's designed to translate an average-size person's body movements into computer commands for a more realistic approach to virtual reality.

The idea is simple: The more the super-sensitive fiberglass is flexed, the less light is transmitted. The computer senses the lost light, then translates it into a movement command. However, not being average size at 6 ft 3 in., I had to settle for the glove.

Nash is a *Computerworld* West Coast bureau correspondent.

Cindy Charles

CW reporter *Nash on the trail of a virtual world*

I nodded in understanding while I strapped on VPL's patented goggles, called Eyephones — a combination of twin color-LCD monitors, cushy ear phones and lead weights. The granulated lead, which hangs in a bag at the back of the phones, acts as a counterweight to the monitors.

Resembling a black cyclist's helmet with front and rear bumpers and weighing as much as two very heavy wet towels, the Eyephone is an interface to be reckoned with. Putting it on is a two-person job; one person pulls apart the headphones, while the other steadies and lowers the bulky Eyephone onto the wearer's head. Wearing it was akin to putting on a welder's mask and a hard hat: You felt secure but a little claustrophobic.

Once you adjust, the resolution is OK, similar to what you would see if you taped a Sony Corp. Watchman to your forehead — but nowhere near as good as your average IBM Video Graphics Array monitor. You can pretty clearly see dots on the screen. The overall effect is a washed-out, shadowy world with a lot of hard angles and no smooth curves.

The glove is connected via a cable to a custom Apple Computer, Inc. Macintosh IIX design/control workstation. The starter setup, called Reality Built for Two (RB²), costs around $45,000 — plus the cost of the requisite advanced graphics workstation at about $50,000 to $100,000.

A whole new world

At first, it's hard to resist the urge to tug on the cable or avoid getting tangled in the bundle that runs between the Eyephone, the glove and the computer — even when you're sitting in a swivel chair.

But once you get past the heavy-headedness and the stifling feeling, life in a computer-generated world borders on realistic. And fun.

Of course, everything is weightless, an odd sensation to those of us who have never been in space. There are no smells other than the stuffy odors of a small office.

Ironically, although I seemed to be wearing blinders, the three-dimensional environment seemed to really exist. I grinned, enjoying the power, as I realized that I was lord of a completely artificial world that would react almost instantly to my presence.

The omnipresent and disembodied hand floating before me is a stylized 3-D representation of my own hand, which is firmly sheathed in the lycra-and-fiber-optic glove. My hand movements are mimicked by the screen hand with a jumpiness and delay like that of a mouse pointer.

Using the glove, it's possible to "move" in a disembodied fashion by crooking a thumb and pointing in the direction I want to float. I find that I can move, ghost-like, through walls.

Objects created in the application — stove tops, doors, steering wheels — can be moved if they have been programmed with a "hold" command, which allows you to "grip" the thin air and reposition them.

Run wild

During my trip I was transported into several environments. After the kitchen, I found myself in a generic, yellow two-door car. After experimenting a bit, I discovered it was possible to open the door, turn the 10-sided steering wheel and shift gears. The dashboard had all the ergonomics of a covered wagon, but nothing that a little more programming can't fix. Because I, like the car, lacked a body and had no pedals to work, it was impossible to do much more than fiddle with the cockpit controls and watch the idiotically waving dials. Soon, I got bored and turned to the next adventure.

Ahhh. This is much better. Puget Sound, Wash. Crude buildings (including a Space Needle of sorts) loom in the east, a bland strip of land to the west. In between is a placid waterway, complete with a whale and a ferry that crisscrosses the channel. I dive beneath the water.

While the details look more like geometry than reality, the illusion of going under the surface and watching both the whale and the ferry is fun. That's because a special algorithm helps make the movements a little bit more realistic. Playing tag with the whale is challenging, because the creature gains speed in a Doppler sort of way as it approaches.

After an hour, it is time to come back to my reality. I thank the VPL staff and head back to my office in Burlingame, Calif., to think about what I have seen.

VPL says virtual reality can be used today for viewing architectural models, scientific data, geophysical displays, sales pitches and design prototyping.

For all the good virtual reality might eventually hold for teaching bloodless surgery or accurate engineering, I decide that I prefer real flesh and blood. For now.

IBM invites you to take a test run.

Announcing Early Test Programs for MVS/ESA SP™ 4.1 and 4.2, VM/ESA™ and VSE/ESA™.

If you're a software vendor, here's a great opportunity to see that your application runs on our new versions of announced software before they become generally available.

Enroll in our Early Test Programs, and you'll receive not only inexpensive test time—via the IBM Information Network—but important documentation and technical support as well.

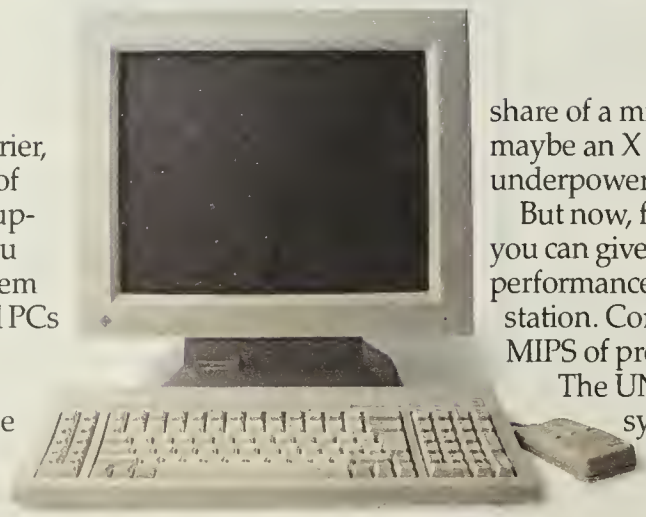
To sign up, or for further details, call 1-800-627-8363. See what the future has to offer. Today.

IBM

© 1990 IBM Corporation. IBM is a registered trademark and MVS/ESA, VM/ESA and VSE/ESA are trademarks of IBM Corp.

WHY DID WE
A 12.5 MIPS W
FOR

BECAUSE



SPARCstation™ SLC. By breaking the $5,000 barrier, it turns the economics of computing absolutely upside down. And lets you give your people a system that runs circles around PCs and minicomputers.

Up till now, for this price you'd have to settle for a 386 with one or two little extras. Or a share of a minicomputer. Or maybe an X terminal with an underpowered processor.

But now, for the same price, you can give everyone a high-performance RISC workstation. Complete with 12.5 MIPS of processing power. The UNIX® operating system. 8 MB of memory. Even built-in Ethernet.®

But more than a hot machine, you can give them all the strategic advantages that come with our SPARC™ technology.

First, our workstations were meant to be networked. So you can have whole groups working on the same project. In perfect synch. And every user has serious processing power. Right at the desktop level. Second, there's the OPEN LOOK™ user interface. Which lets people learn to use UNIX in no time flat. Finally, there's UNIX itself. With UNIX, your people can create

© 1990 Sun Microsystems, Inc. ®Sun Microsystems and the Sun logo are registered trademarks of Sun Microsystems, Inc. SPARCstation, SPARC, and SPARCware are trademarks of Sun Microsystems, Inc. OPEN LOOK is a trademark of AT&T. UNIX is a registered trademark

INTRODUCE
ORKSTATION
4,995?

WE CAN.

applications that would take a lifetime to develop any other way. In fact, there are over 2,000 SPARCware™ applications that are ready to run right now. So you have the added advantage of choosing the world's largest standard for RISC/UNIX software compatibility.

How did we design all this into a $5,000 system? Since 1982, we've built nothing but UNIX workstations. So we've learned a few things. We completely eliminated the processor box. By building the electronics into the back of the monitor. We gave it a high-resolution monochrome display. And since SPARCstation SLC is designed for workgroups, all the files can be stored in a central server. Or on a local disk, if you'd rather.

For a lot of companies, introducing a machine like this would be next to impossible. But at Sun, it's not exactly our first breakthrough. And this is no announce-it-today, ship-it-next-year product, either. SPARCstation SLC is available in quantity today.

SPARCstation SLC. If you'd like to see how it compares to every other system you could buy, just call 1-800-624-8999 ext. 2066. From anywhere in the U.S. and Canada. And get ready to move your people a quantum leap ahead.

Because now you can.

sun microsystems

of AT&T. Ethernet is a registered trademark of Xerox Corporation. *U.S. List Price Quantity 1, $4,995. Includes a 17-inch, high-resolution monochrome display, 8 MB of main memory, integral Ethernet, SCSI, and serial interfaces, and the Sun Operating System.

HOW OTHERS SEE THE MACINTOSH-TO-MAINFRAME CONNECTION.

HOW AVATAR SEES IT.

When it comes to system integration, you don't have to treat the Mac differently than any other device on your network. Introducing the MacMainFrame Series, the broadest range of Macintosh-to-mainframe connectivity options available.

MORE CHOICES. MORE SOLUTIONS.

Now, in an integrated set of solutions, local or remote Mac users in Token Ring, SDLC or coax environments can tap centralized information to make every Mac user's desktop more powerful.

MacMainFrame distributes terminal emulation, file transfer, printer emulation and mainframe graphics across a wide variety of networking schemes.

Since it's fully AppleTalk compatible, EtherTalk, TokenTalk and LocalTalk networks are part of the solution, too.

For customization, there's Avatar's Programmer's Toolkit, a full range of Applications Programming Interface (API) tools. For example, Avatar's Hypercard API has been used to develop a front end system to PROFS, IBM's electronic mail system.

THE MACMAINFRAME DIFFERENCE.

Unlike some Mac-to-mainframe connections, MacMainFrame enhances the benefits of the Macintosh user experience.

Since MacMainFrame is completely IBM 3270 compatible, it has no impact on normal mainframe operations. The result? An integrated working environment that increases productivity and reduces headaches.

SOMETHING ELSE WE SEE. SERVICE.

With eight years of experience, Avatar offers something beyond products and technology. It's called responsiveness. You see, as the 3270 connectivity specialists, we have helped to integrate Macintosh computers and PC printers into many different environments. Which means we can do the same for you. With a single integrated set of solutions for Token Ring, SDLC, and coax, both standalone and via gateway.

To find out how, call this number toll free at

1-800-289-2526.

You'll find that we understand Macintosh-to-mainframe connectivity like no one else. So as your network options continue to grow, Avatar can help you see the forest through the trees.

Avatar.

65 South Street, Hopkinton, MA 01748

© 1990 Avatar Corporation

DCW6

NATIONAL
BRIEFS

Major shift at DG

Those who wondered what was up at **Data General Corp.** this month when three senior executives dropped from the employee rolls got their answer last week: a reorganization, aimed at speeding DG's return to profits. Under the new order, veteran DG executive **Tom West** will head the Advanced Systems Development Group. **Allan Jennings** will lead DG's Aviion Development Group. **William Zastrow** will do the same for DG. **Peter Gyenes** will head up international operations. **Joel Schwartz** will hold sway over proprietary systems efforts, and **Electronic Data Systems Corp.** veteran **David Jacob** will lead the firm's charge into systems integration.

Staying alive

Struggling for survival, San Antonio-based **Datapoint Corp.** released an announcement stating that the firm, aided by financial advisor **Kidder-Peabody & Co.**, "continues to explore [its] strategic alternatives . . . However, there can be no assurance that any strategic transaction will be consummated." Stay tuned.

EDS rides outsourcing to riches

Cost-cutting pitch wins points on executive row, but not always with IS management

BY PAUL GILLIN
CW STAFF

Three years ago, when a major Midwestern manufacturer started work on a new production line, it selected Electronic Data Systems Corp. to handle the factory automation work.

"They were a rather pushy company," remembered the information systems director, who requested anonymity. "They were always trying to expand what they were doing, make contact with upper management and get more business.

"But in the end," he continued, "they threw the resources at the job to get it done. I would rate myself a satisfied customer — with qualifications."

Hot-and-cold attitudes are not unusual among IS directors who have dealt with EDS. The company has a reputation for relentlessly pursuing new business once it gets inside a customer's door. But EDS has also won fans in both IS and senior management for the quality of its facilities management work and for generally delivering the cost savings it promises.

Today, EDS appears to be well-positioned to take advantage of the swell of interest in data center outsourcing. "They are in the finest single position of anybody in the industry," said Howard Anderson, president of The Yankee Group, a market research firm.

Observers cited a number of big advantages EDS enjoys: It has 28 years of outsourcing experience and a $127 billion sugar daddy in parent company General Motors Corp., which acquired EDS in 1984 and still accounts for more than half of its $6 billion in revenue. EDS has technology-sharing agreements or equity investments in dozens of vertical market firms. It is still sitting on nearly $500 million in cash with which to finance acquisitions in a depressed stock market. And a recent reorganization has split the company into vertical industry business units, geared to allow EDS to respond to changes in the market more quickly.

"Competitively, they're an absolute juggernaut," said Stephen McClellan, an analyst at Merrill Lynch Research/U.S.

McClellan rated EDS' stock (GM Class E) a "buy" and forecast 15% annual earnings growth during the next five years. Prudential-Bache Securities, Inc. analyst Charles E. Taylor Jr. rated EDS stock the most attractive of a generally moribund high-tech group right now. The Yankee Group sees EDS revenue approaching $10 billion in 1993 and its GM-derived revenue decreasing to a little more than one-third of total sales, compared with more than half today.

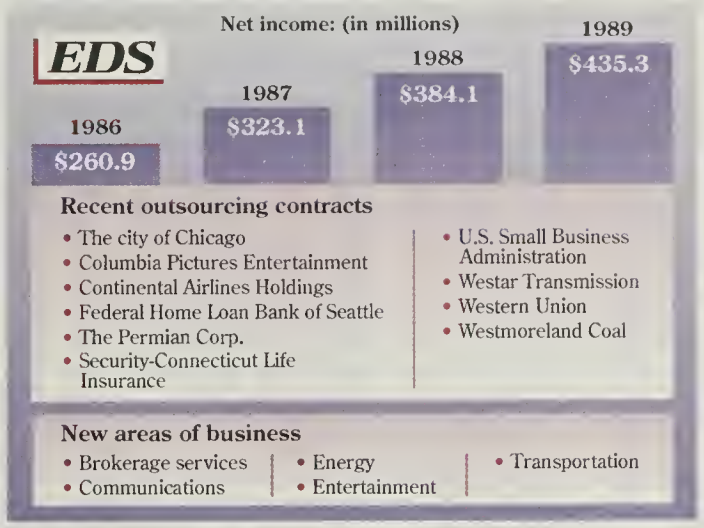
For a company that is still widely viewed as either a government contractor or GM's data processing department, EDS' list of recent commercial outsourcing deals is long. The crown jewel of 1990 is a 10-year contract to manage the IS operations of the System One airline reservations system. The deal, which is still pending, will generate $4 billion in revenue, EDS estimated. The company has a contract backlog of at least $16 billion.

EDS' success is not necessarily good news to IS directors. Many feel the confidence bred by that success has served to strengthen an arrogant strain that already loomed too large for customer comfort. EDS has historically sold over the IS director's head, bid-

Continued on page 117

Mining outsourcing's gold

Even as it piles up facilities management contracts, EDS continues to discover new veins of business to explore



Source: Electronic Data Systems Corp. CW Chart: Doreen St. John

THINK DIGITAL • THINK ROSS

The best financial, distribution and human resource software for the Digital™ VAX® system.
Call Ross Systems today for more information: 404/257-9198, Ext. 190

digital Cooperative Marketing Program

Digital is a trademark and VAX is a registered trademark of Digital Equipment Corporation

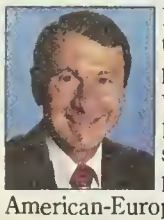
ROSS SYSTEMS
THE DIGITAL STANDARD
555 Twin Dolphin Drive, Redwood City, CA 94065

1989 digital review TARGET AWARDS WINNER
1990 digital review TARGET AWARDS WINNER

COMMENTARY

Gary H. Anthes

Collaborators with cold feet



Next month, a delegation led by the U.S. Department of Commerce will travel to Tokyo to present the U.S. response to Japan's recent proposal of a Japanese-American-European collaboration in intelligent manufacturing systems. If the tone set at a recent workshop on the topic is any indication, it will be tough going.

More than 100 people from U.S. industry and academia recently attended an informal half-day meeting at the Commerce Department to present their views on international collaboration in advanced manufacturing or, as one official put it, to help decide how to respond to "the wake-up call from Japan." Judging from comments made and not made, it can safely be said that most U.S. companies view intercompany and intercountry collaboration as being a bit like going to the dentist — it's no fun, and you put it off as long as you dare, but eventually you go because you have to.

Suspicion about the idea of getting into the testbed with competitors is natural, and the way the Japanese proposal was first made contributed to the prevalent view that the idea is just another way for Japan to take our ideas and run with them all the way to the bank. Japan's Ministry of International Trade and Development (MITI) originally proposed a 10-year, $1 billion collaboration, with MITI putting up $400 million and Japanese, U.S. and European industries each kicking in $200 million.

The U.S. and Europe looked that gift horse in the mouth, saw too many Japanese teeth and said, "No, thanks." A new proposal from Japan, made in August, suggests equal funding — and, hence, equal control — from the three regions.

An official with the Commerce Department said the Japanese explained the unequal payment idea as simply one of altruism, a way to show gratitude for the Marshall Plan. No one laughed at that, but no one believed it, either. "My greatest nightmare is that we go to all the trouble to set this up, and the Japanese come in and mine it while we stand back and bask in the glow and don't mine it," said Leo Hanifin, director of the Center for Manufacturing Productivity and Technology Transfer at Rensselaer Polytechnic Institute.

Carefully picking the projects on which to collaborate is key to putting together a win-win-win consortium. According to Commerce, Japan spends only 20% of its research and development dollars on basic research and the balance on applied, product-specific research. In the U.S., the numbers are approximately reversed. Balancing and complementing the strengths and weaknesses of each side are necessary to ensure that each party gets to do its fair share of "mining."

Paul Huray, senior vice-president for research at the University of South Carolina, and others suggested that another way to achieve win-win would be to propose projects in areas such as standards and industrial safety.

The Commerce Department says one of the problems with the first Japanese initiative, which bypassed Uncle Sam and went directly to U.S. industry, was that it appeared to be going after superior American know-how in software, artificial intelligence and systems integration technology without an equitable exchange of technologies.

> "MY GREATEST NIGHTMARE is that we go to all the trouble to set this up, and the Japanese come in and mine it while we stand back and bask in the glow and don't mine it."
>
> LEO HANIFIN
> RENSSELAER POLYTECHNIC INSTITUTE

But Masahiro Meshii, a professor in the Department of Materials Science and Engineering at Northwestern University, said U.S. industry is too concerned about the loss of basic research knowledge, inasmuch as most of that is available now for the asking from U.S. universities and federal agencies. He strongly endorsed the consortium idea.

One other area of naivete shown by some attending the workshop was an assumption that the U.S. government would substantially fund one or more international technology consortia. In a climate of budget cuts and anti-"industrial policy," there are two chances the government will do that: slim and none.

Mark S. Lieberman, deputy assistant secretary for technology policy at the Commerce Department, will lead the U.S. delegation. He said he's looking for guidance from industry. Comments may be sent to him at the U.S. Department of Commerce, Washington, D.C. 20230.

Anthes is *Computerworld's* Washington, D.C., correspondent.

UDS V.32 Modems: winners at 19.2 kbps—now FasTalk doubles the speed

From the day of its introduction, UDS' V.32 modem has gathered honors from leading computer publications and other industry watchers!

Initially it set the standard for 9.6 kbps, full-duplex traffic over dial-up lines. When MNP® level 5 data compression was added, throughput went to 19.2 kbps.

Now comes the FasTalk V.32/42b—a modem that is specifically designed for PC applications and is fully compliant with CCITT's V.42*bis* recommendation. Meeting this standard gives the V.32/42b a maximum data rate of 38.4 kbps!

The modem is particularly useful for bit-intensive data transfers, such as engineering graphics, image processing and complex financial operations. Data Rate is automatically adjusted to 9600, 4800, 2400 or 300 bps (CCITT V.32 and V.22*bis*). At the 9600 bps rate, trellis coding gives the FasTalk V.32/42b an exceptionally high tolerance for noisy lines.

For accurate communication over worst-case lines, the unit incorporates V.42 LAP-M and MNP 4 error control functions. A full complement of on-board test functions is included, and eight LEDs provide easy monitoring of the unit's operation and built-in diagnostic features.

Get acquainted with the latest winner in the UDS V.32 family. For technical details and quantity pricing, contact UDS, 5000 Bradford Drive, Huntsville, AL 35805-1993. Telephone 205/430-8000; FAX 205/430-8926.

UDS MOTOROLA

MNP® is a registered trademark of Microcom Systems, Inc
Created by Dayner/Hall, Inc., Winter Park, Florida

IBM may be on the lookout for new networking partner

ANALYSIS

BY JIM NASH
CW STAFF

IBM and Microsoft Corp. have been together for so long, they share the same toothbrush. But monogamy may be one thing IBM is willing to sacrifice in the name of long-term networking market share.

About a dozen information systems managers contacted by *Computerworld* earlier this month said they believed IBM would be foolish not to consider at least one more solid local-area network partner beyond Microsoft. With about 60% of the LAN installed base sewn up, Novell, Inc. looks like the logical candidate. Novell would in turn gain much from closer ties to the hardware-standards king, the IS managers contended.

Users said they see greater cooperation between Novell and IBM as key to getting greater network interoperability and investment security. Down the line, every IS manager contacted said the warming rapport between the two companies of late is not enough to allay their overriding concern: How to fully connect extremely heterogeneous workplaces.

This concern could account for the optimism with which all reacted to an item in a newsletter published by consulting firm Meta Group, Inc. that predicted the likelihood of a formal agreement between IBM and Novell within the next 60 days. Meta Group analyst Frank Michnoff said he believes there is a good chance that the two will go so far as to staff a joint office dedicated to smoothing barriers between the two companies' product lines.

Rumors run rampant

Terry Bergman, senior personal computer coordinator at Toshiba America, Inc., and Bill Wolfe, president-elect of the Affiliation of Netware Users, said that they have heard rumors to that effect.

"IBM has realized that it's a multiplayer [LAN] game," Bergman said.

Wolfe said that he first heard murmurs of an IBM/Novell pact in 1989. He speculated that IBM may be growing nervous as Compaq Computer Corp. continues to move ahead in the server and workstation markets. He added that he looks forward to seeing IBM sell PCs with Netware already stored on their hard disks to simplify the configuration process.

Darryl Miller, executive vice-president of Novell's marketing and services, did not deny that such a proposition could be in the works. Miller said that while he knew of no such plans, "we always hold out the potential for such relationships."

An IBM spokesman said that specific cooperative agreements on specific products are anticipated, but no broad initiatives were expected. He emphasized IBM's continued support for Microsoft's LAN Manager network operating system, which serves as the core of IBM's LAN Server.

"On a de facto basis, a cooperative agreement already exists," explained Bill Lawrence, network engineer at Southern California Edison in Irvine, Calif.

IBM currently markets Novell's Netware as part of its education-oriented and federal government networking systems. Novell has demonstrated porting Netware for IBM's Application System/400 using the midrange mainframe as a back up for the network. Also, at the Networld '90 Dallas trade show, the Provo, Utah-based company demonstrated Netware running on Officevision.

However, network managers want more. One IS manager said that he has long and reluctantly planned a shift from the Netware network operating system to Microsoft's LAN Manager in order to capitalize on IBM's staying power. Jeff Larimore, IS director at Home Intensive Care, Inc. in North Miami Beach, Fla., said he would abandon those plans if Novell and IBM were more in synch.

He explained that while Novell currently builds hooks into its products that tie into IBM hardware, that effort is not reciprocated. If it were, Larimore said, he could standardize on Novell without worrying about his long-term investment. Larimore runs a 60-user Netware network today and said he expects to add 15 more users in three regional offices in the Southeast soon. Lawrence said he would like to see Novell more fully support IBM's OS/2 Extended Edition, especially the operating system's data manager capabilities.

"For developers, [a closer relationship] would be fantastic," said Todd Booth, senior software specialist at Quotron Systems, Inc. Quotron develops software to deliver financial information to data brokers, most of whom have multivendor networks. "We have to look at what the customers have [installed], and the customers have everything."

Booth explained that he would like to see a new network-layer product from IBM that would accommodate Novell's media-independent Netware. "Maybe LAN Server could support [Internetwork Packet Exchange]," the protocol used by Netware. "Or at least they could come up with a common protocol," he said.

The SOLUTIONStation
Enter A World Of Integrated Applications
On A Full-Function, Full-Color, Entry-Level Workstation.

Available now: the Series 2000. An entry-level RISC workstation with high-resolution, 19-inch full color graphics. Easy-to-learn, icon-based user interface. Multivendor connectivity. Main memory of 16MB (expandable to 64MB). And a 200MB internal disk. An open UNIX platform that conforms to all industry standards. Ideal for meeting your needs in creating and managing technical information.

Available now: integrated Intergraph applications. We go beyond where our competitors stop – with industry-leading integration across the broadest portfolio of technical applications. Add to this, support for a full range of industry-standard third-party software. Providing over 900 technical applications available for immediate delivery.

Available now: worldwide solutions. As the #1 supplier of CAD/CAM/CAE in North America, Intergraph is a *Fortune 500* corporation supplying solutions worldwide for more than two decades. The Series 2000 is being manufactured in the U.S. and Europe now for immediate availability. For more information and a demonstration, call 800-826-3515.

INTERGRAPH
Everywhere you look.

Intergraph® is a registered trademark and Everywhere You Look is a trademark of Intergraph Corporation. Other brands and product names are trademarks of their respective owners. Copyright 1990 Intergraph Corporation, Huntsville, Alabama 35894-0001 DOAI•05

IBM in the clear — somewhat

Others dissatisfied that Navy was not found unfairly influenced by IBM

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — IBM is off the hook for now on allegations that it unfairly influenced the U.S. Navy's computer procurement process. But the book is not yet closed on the 2-year-old controversy, in which six IBM competitors charged that IBM, the Navy or both acted improperly in steering business to the computer giant.

Also, independent of the specific Navy/IBM case, various federal oversight groups continue to grumble about what they see as an unjustified tendency to award mainframe contracts to IBM at the expense of viable plug-compatible competitors.

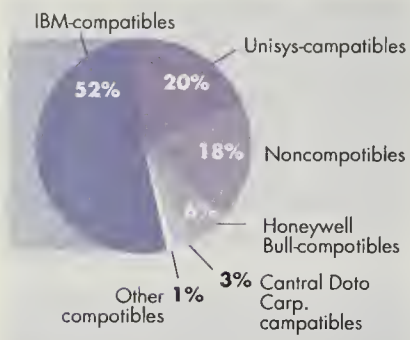
An investigation by the Navy into allegations of unethical conduct in several Navy procurements on which IBM bid found no evidence of wrongdoing on the firm's part.

"My conclusion is that IBM is an aggressive but fair competitor in the federal marketplace," said Rep. Frank Horton (R-N.Y.), a member of the House Government Operations Committee, which had requested the probe.

However, a source close to the investigation said the committee's final investigative report, to be released later this month, will find "a clear intent by the Navy to steer business to IBM." He said the report is likely to say that IBM was not totally blameless either.

Still investigating

Over half of government procurements have been going to IBM, but whether favorites are being played remains to be decided



Percent of total procurements according to type of compatibility (Total: 1.94B)

Source: General Accounting Office CW Chart: Doreen St. John

Despite a host of legal requirements for full and open competition, true competition in the federal marketplace for mainframe computers is "a myth," committee chairman Rep. John Conyers Jr. (D-Mich.) charged at a recent congressional hearing.

Conyers said agencies have a knee-jerk tendency to make awards to IBM, unfairly excluding competitors. "We have found that four federal agencies — Health and Human Services, Treasury, Agriculture and NASA — are so heavily dominated by IBM that it must be discouraging for IBM's competitors to even try," he said.

At Agriculture and Health and Human Services, for example, IBM labels hang on more than 80% of the mainframe boxes, according to figures from the U.S. General Accounting Office (GAO).

IBM disputes the assertion that it unfairly dominates, saying it sees greater competition in the government market than anywhere else.

While IBM has about 70% of the worldwide market for large systems, the GAO says that IBM has won only 47% of the large federal system buys over a recent three-year period.

IBM says the reason for its poorer performance in the government is that federal procurements are more driven by price — where the plug-compatible firms such as Amdahl Corp. generally have an edge — than by considerations of service and technology, where IBM insists it enjoys advantages.

An IBM spokesman said that federal computer users and taxpayers will be ill-served if an obsession to find a level playing field results in requests for proposals that are pitched at the lowest common denominator. "If they drop the level of technology to what's already been copied [from IBM by the plug-compatible competitors], lots of companies can bid, but the government will be 12 to 18 months behind on the technology," the spokesman said.

He added that IBM supports a growing trend for agencies to structure procurements to favor greatest value rather than lowest price.

However, clearly the shoe smarts when it is on the other foot. IBM recently protested an $841 million computer award by the U.S. State Department to Wang Laboratories, Inc., saying the competition was stacked unfairly in Wang's favor in various ways. The assertion is hard to prove or disprove, but a State Department official recently told *Computerworld* why the agency is dominated by Wang gear: "We bought Wang equipment years ago when they had the best word processing capability. We continue to buy it for compatibility reasons and because they give us superb service."

The GAO's figures showed that 82% of all mainframe procurements limit competition in some way. Based on a sample of mainframe buys totalling $1.9 billion, 52% specified IBM compatibility, and of those, IBM won 65% of the awards.

Milton J. Socolar, a GAO official, said agencies sometimes have legitimate reasons for limiting competition, as when a large installed base of software mandates compatibility. But he also said GAO had found examples "where competition was limited by a desire to expedite the procurement process or deliberately favor a particular vendor."

> "WE HAVE FOUND that four federal agencies — Health and Human Services, Treasury, Agriculture, and NASA — are so heavily dominated by IBM that it must be discouraging for IBM's competitors to even try."
>
> REP. JOHN CONYERS JR.
> D-MICH.

Elmer Clegg, vice-president for federal operations at Amdahl, said the Navy has made improvements in its procurement processes recently, strengthening procurement management and oversight, appointing a procurement ombudsman and improving systems specifications in requests for bids. "Overall, in the past 12 to 18 months, we've gotten a good shot at the procurements the Navy has put on the street," he said.

However, Clegg added that he still sees "pockets of IBM bias in the Navy and elsewhere in the U.S. government."

New hands on deck at consortium helm

BY SALLY CUSACK
CW STAFF

AUSTIN, Texas — Sematech, a research and development consortium composed of 14 major U.S. semiconductor manufacturers and the U.S. Department of Defense, has named William J. Spencer as its new president and chief executive officer.

Spencer, a group vice-president and senior technical officer at Xerox Corp. in Stamford, Conn., succeeds the late Robert N. Noyce, who headed the consortium from July 1988 until his sudden death last June.

Spencer will direct Sematech's advanced semiconductor manufacturing staff and will also serve as the consortium's primary liaison to its member companies and the government.

Sematech defines its mission as providing the U.S. industry with the domestic capability for world leadership in semiconductor manufacturing. Member companies include: Advanced Micro Devices, AT&T, Digital Equipment Corp., Harris Corp., Micron Technology, Hewlett-Packard Co., IBM, Intel Corp., Motorola, Inc., Rockwell International, NCR Corp., National Semiconductor, Texas Instruments and LSI Logic.

Sematech's Spencer

Other members of the executive suite include Turner E. Hasty, chief operating officer, and Peter H. Mills, chief administrative officer.

Prior to Xerox, Spencer held research positions at Bell Laboratories and Sandia National Laboratories. He was research professor of medicine at the University of New Mexico's School of Medicine and received his Ph.D. in physics from Kansas State University.

> SEMATECH DEFINES ITS mission as providing the U.S. industry with the domestic capability for world leadership in semiconductor manufacturing.

As a consortium, Sematech is working to change national attitudes toward manufacturing by partnering with U.S. universities and research institutions to foster fresh, new ideas and expose academia to opportunities in the manufacturing sector.

EXECUTIVE CORNER

Parallan invites new CEO to guide firm to profitability

William B. Patton, the executive who guided **MAI Basic Four, Inc.** from losses to profits while increasing its profits almost 100% to $450 million, is the new chairman and chief executive officer at **Parallan Computer, Inc.**, in Mountain View, Calif. Parallan Computer makes and markets OS/2-based servers for use in client/server computing. Its executive team, which includes co-founder, President and developer **Giancarlo Ratazzi**, is hoping to leverage Patton's long-term industry experience and reputation for customer focus.

Cambridge, Mass.-based **On Technology, Inc.**, purveyors of applications software for the Apple Computer, Inc. Macintosh, has a new president: former marketing Vice-President **Conall Ryan**, who coordinated the rollout of On Technology's maiden product. Ryan joined the firm last year, following a stint as marketing manager at Next Computer, Inc. He succeeds On Technology co-founder **Mitch Kapor**, who will stay on as chairman.

Twenty-five-year computer industry veteran **J. Carl Masi** has been named vice-president of corporate marketing at **Unisys Corp.** Masi, 49, is a former International Data Corp. chief executive officer; prior to that, he spent 12 years serving Wang Laboratories, Inc. in a variety of senior management positions.

Maxtor Corp. has named **Albert J. Moyer** to the newly-created position of president and chief operating officer at the San Jose, Calif.-based disk drive company. Moyer, an electronics industry veteran, most recently served at Western Digital Corp., where he was senior vice-president and chief financial officer.

EDS

CONTINUED FROM PAGE 113

ding to take over the entire data center, said Rich Schmitt, president of Schmitt Consulting Group, Inc., a St. Louis-based outsourcing consultant. "EDS traditionally has wanted all or nothing," he said.

As a result, "Most IS managers I've dealt with who have worked with EDS have had a negative experience," said Richard A. Katzman, a New Cumberland, Pa.-based consultant who specializes in outsourcing advice. Employees who do not like the high-pressure culture they encounter when they transfer to EDS have no choice but to leave, he said.

EDS officials said they are trying to change the company's hard-bitten image, and they have won some admirers. "EDS has a very progressive set of career opportunities for their people, particularly their technical people," said John L. Torres, vice-president of The Ledgeway Group, a market research firm based in Lexington, Mass.

The company spends more than $100 million per year training its 60,000-employee work force. Its Systems Engineer Development program is so expensive that employees are required to reimburse the company if they leave within three years after completing the 10-week course.

IS managers will probably be hearing a lot more from EDS if the outsourcing trend builds as expected. EDS has used a pile of cash generated by the steady and profitable GM revenue stream to fund a distinctive contracting style: When the firm signs a pact to manage a data center, it also often buys an equity stake in the customer's firm. This allows EDS to gain vertical market footholds while simultaneously winning new business.

EDS paid $250 million for a 50% stake in Texas Air Corp.'s System One in February before signing the $4 billion outsourcing agreement [CW, Feb. 26]. Early last month it bought a stake in Westwood Equities Corp., a financial services firm, and signed a contract for an unspecified amount to run IS for Westwood's operating subsidiaries. Last year, it acquired a 20% equity stake in Hitachi Data Systems Corp. while picking up a deal to run the mainframe maker's North American IS.

EDS Chairman Les Alberthal calls the equity investment strategy merely a customer-driven change in the contracting process. "[Customers] want to take something out of that [data processing] investment that they've spent 30 years putting money into," he said.

It is also a way for EDS to pick up vertical market expertise that it can leverage elsewhere. For example, EDS officials said that the more than 8,000 employees it absorbed in acquiring and consolidating GM's data processing centers gave it manufacturing expertise it could never have acquired otherwise.

"We've had a cram course in manufacturing over the last six years," Alberthal said. That experience has helped EDS win business from such companies as Caterpillar, Inc., Cummins Engine Co. and Hoechst AG of Germany. It also led EDS last month to take an equity stake in Ask Computer Systems, Inc., a developer of manufacturing software [CW, Sept. 17].

Market watchers say that the risks for EDS are fairly small. The firm has a big head start on its direct competitors, said several analysts, and its market is growing fast enough to give everyone a piece of the action.

The most immediate threat to EDS' success is probably its own aggressive expansion, Torres said. "As you expand, your ability to manage consistently becomes much more of a challenge," he said.

EDS also needs to trade in its reputation for targeting only top management for a gentler image that stresses flexibility and accommodation to the customer's needs, analysts observed. EDS officials said that this year's multifaceted campaign to gain expertise in new vertical markets is part of an effort to do just that.

INTERNATIONAL

BRIEFS

Philips slashes

The latest move in Dutch electronics giant **Philips N.V.**'s multiphase effort to boost itself back to the black side of the ledger and into a more competitive stance vis-a-vis its Japan rivals by cutting loose its unprofitable computer operations will be the layoff of 4,900 computer-related employees, the firm announced last week. According to recently appointed Chairman **Jan Timmer**, who is bidding to be the architect of Philips' reconstruction, the information systems division cut is one stage of a probable 10,000-person layoff anticipated as required for the firm's recovery.

'Bingo' in Spanish?

Ask the folks at **Stratus Computer, Inc.** The Marlboro, Mass.-based fault-tolerant computer vendor's $3.5 million contract with Madrid-based **Sustemas Technicos do Lotterias del Estad S.A.** will automate Spain's national lottery, which is said to be among the world's largest.

The Graphical Relational Database Management System That Does More Than Windows.

Want a clearer view of your organization's data? New Access SQL Version 1.1 makes it easy.

Access SQL is a relational database management system (RDMS) front-end that lets you access, manage, enter, and utilize valuable data from across your organization. Quickly and easily.

Windows. Thanks to the Microsoft® Windows graphical user interface, Access SQL is easy to use from day one. Pull-down menus and dialog boxes make any database operation simple and fast.

Powerful SQL Access without complexity. Whether you are a novice user or a programmer, Access SQL provides simplicity while also providing tools robust enough to satisfy complex requirements. Build queries by simple point and click demands.

Reports and Forms. View and update databases via table format or customized forms, and create polished professional reports in a graphical environment.

Client-Server Architecture. Access SQL uses new client-server architecture to share computer chores between your PC and a centralized database server. This guarantees better performance through reduced traffic on the network and optimizes database speed.

Flexibility. Access SQL features complete SQL (Structured Query Language) support by utilizing a popular SQL database server. Database administration is a snap with user level access control, backup and restore, and powerful table management.

Access SQL will help you see your organization in a whole new light.

For more information and a free demo disk, call Software Products International at **800-937-4774** or **619-450-1526.**

SOFTWARE PRODUCTS International

Software Products International
10240 Sorrento Valley Road
San Diego, CA 92121-1697
1-800-937-4774

"Our PCs turned out to be the perfect solution for X windows."

My management wants to leverage our investment in PCs. Can we use them as X windows terminals?

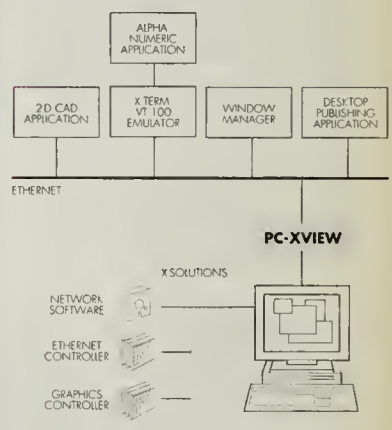
There's an answer. . .

Spectragraphics and PC-Xview.

With PC-Xview and a simple Ethernet connection to a host supporting X windows, my PCs become fully functioning X stations.

I'll have the best of both worlds—X windows graphics plus all my DOS applications, functions and utilities. My PC users can also share data and applications with other X window system users.

When it comes to X window solutions, I know I can count on Spectragraphics. They have all the right connections to put X window applications throughout my organization, from PCs to mainframes.



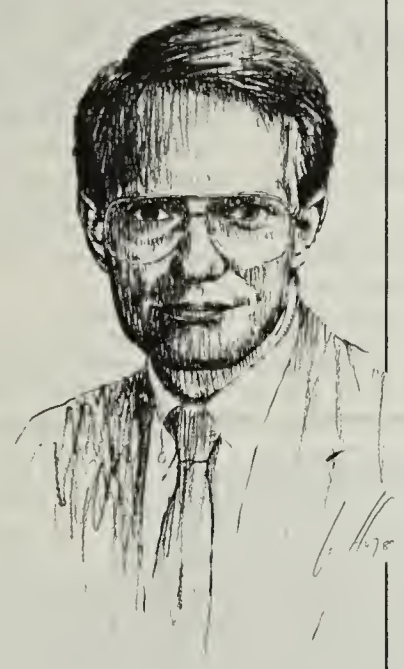
FREE X WINDOWS GUIDE.

For more information on PC-Xview, or a free copy of the X windows Guide, call (619) 587-6969, FAX (619) 450-0218. Or write, X-Guide, Spectragraphics Corporation, 9707 Waples Street, San Diego, CA 92121.

SPECTRAGRAPHICS®

Connecting With Your Ideas.

PC/XVIEW IS A TRADEMARK OF SPECTRAGRAPHICS CORPORATION. ALL OTHER TRADEMARKS AND COPYRIGHTS ACKNOWLEDGED © 1990 SPECTRAGRAPHICS CORPORATION



"...We turned leads into sales in just 60 days. So our Computerworld Response Card advertising quickly paid for itself."

— Russ Teubner
President
Teubner & Associates, Inc.

Teubner & Associates, Inc., a developer of communications software based in Stillwater, Oklahoma, has just introduced FaxGate into the IBM arena. FaxGate, the facsimile gateway for IBM mainframes, allows direct printing of high-quality output on virtually every fax machine worldwide. Now it's up to President Russ Teubner to utilize the most cost-efficient means for telling IBM mainframe users about this one-of-a-kind communications product.

"Specifically, our target market is Fortune 500 and 1000 companies. On a much wider scale, however, all owners of IBM mainframes are potential buyers. We know that Computerworld provides the best penetration into this broad-based audience and gets our message into the hands of all the people making the buying decisions. That's why we're running a consistent advertising program in Computerworld Response Card Decks.

"True, I was a bit skeptical of the potential value of response card advertising. What I've found out, though, is that a bunch of people do look at card decks. Now I'm a true believer. Experience shows that Computerworld Response Cards cost effectively deliver our message to the qualified prospects we need to reach.

"Our marketing goal is to generate quality leads — and to turn as many as possible into sales. By focusing on MIS decision makers, Computerworld Response Cards are playing a key role in helping us achieve this goal. Results tell me that Computerworld Response Cards will remain a standard part of our advertising mix."

Computerworld Direct Response Cards give you a cost-effective way to reach *Computerworld*'s powerful buying audience of over 134,000 computer professionals. They're working for Teubner & Associates — and they can work for you. Call Norma Tamburrino, National Account Manager, *Computerworld* Direct Response Cards, at (201) 587-0090, or (201) 587-0297 to reserve your space today.

COMPUTERWORLD
DIRECT RESPONSE CARDS

IS banking careers feeling the squeeze

BY CONNIE WINKLER
SPECIAL TO CW

The actor's lament, "Don't call us, we'll call you" is proving just as accurate for the banking industry, which is in a state of high economic drama.

Indeed, at the end of first-quarter 1989, the commercial banking industry held 1,526,255 full-time employees; at the end of first-quarter 1990, that figure stood at 1,507,413, according to the FDIC Quarterly Banking Profile. What this translates to is about 18,842 layoffs or jobs slashed through attrition.

Since the first quarter of this year, thousands more bank employees have suffered similar fates. Although data couldn't be located on the number of information systems employees affected, recruiters and consultants report a rather bleak outlook for the industry.

"It's not a pretty picture for banking, what with the rest of the financial world sprawled all over the mat," says Chick Bisberg, president of Two-Party Systems, a recruitment firm in Livingston, N.J. "I'm hearing from senior-level IS managers who were unceremoniously dumped into the marketplace because of cutbacks, mergers or whatever the euphemism [the company uses is]."

The situation is especially painful for the IS professional whom the headhunters label "plain vanilla." Bisberg offers little hope for IS managers with generic management backgrounds: "They've done a solid job for 20 to 25 years, and suddenly they're without prospects."

These plain vanillas — mostly middle-aged, middle managers who have only worked on mainframes in the banking industry — are paying for the huge upheavals now facing the financial arena. It's an industry reeling from the savings and loan crisis, the stock market and real estate crashes and banking industry cutbacks and consolidations.

Curiously, the savings and loan defaults have had a lesser impact on IS employment: The thrifts frequently ran smaller systems and were always short on IS help anyway, employment experts say.

Bleeding nation

Most of the nation's leading banks, ranging from Chase Manhattan in New York to Bank of Boston and Bank of New England in Boston, have already had major employee layoffs. Even banks experiencing no cutbacks in IS are affected: Employee morale is low, and less work gets done because employees spend a lot of time trying to divine the meaning of the top manager realignments at many institutions, employees at several large banks report.

Nowhere is the upheaval greater than in the Northeast — particularly in the Boston and New York headquarters of the nation's biggest banks and financial institutions.

IS employees whose jobs are "safe" are nonetheless suffering the ramifications, salarywise. Even though it's good news that these people still have jobs, they can expect only slight salary improvements, says Roger O'Connor, senior consultant at Edward Perlin Associates, a management consulting firm. Banks are implementing major cost-cutting programs and have a surfeit of job applicants.

While opportunities are close to zero for some, the job scene improves dramatically if employees have strong technical skills, according to employment specialists contacted nationally. Demand is high for technical expertise in workstations and interfaces, the C programming language, Unix, Microsoft Corp.'s Windows, computer-aided software engineering tools and expert systems.

The most sought-after expertise, recruiters say, is in local-area network management, especially connecting networked personal computers to other systems. At one Wall Street bank, an office automation manager hired LAN administrators one year ago for $35,000 to $40,000; this year, the starting salary is $55,000 to $60,000. Suddenly, LANs have the blessing of senior IS management, the manager reports. "Until now, IS got away with thinking of PCs as toys. When they're networked, in order to function effectively, the LANs have to be institutionalized," the manager says.

Suzanna Opper, a consultant in New York who specializes in work-group computing, recommends that IS employees take time to get some LAN experience. After that, she advises them to move into other LAN jobs with greater opportunities outside of the banking industry. "The realistic financial services people I know are looking to move out," she adds.

Oldies show

One hidden area of opportunity is what John Heckers calls the "oldies but goldies." This means knowing how to use systems that are not trendy but are still being used because management can't afford to replace them, says Heckers, the founder and president of JWJ Consulting, Inc. in Denver, which fills jobs in mainframe shops. Programmers just want to learn and play with the newest toys and products and then move on, he says, but firms are stuck with old systems now more than ever.

While the East Coast and the Sunbelt are no longer the promised lands, recruiters report that they're having better luck placing IS professionals in the Midwest — Illinois, Ohio, Wisconsin — and California, particularly in Los Angeles.

However, relocation is no longer the salvation that it seemed to be in the 1970s and 1980s. An increasing number of firms refuse to pay the average $15,000 that it costs to relocate a family. Likewise, individuals are hesitant to take on that risk themselves. People now ask themselves, "What's the downside if things don't work out at the new assignment?" Bisberg says.

Winkler is a free-lance writer based in Seattle.

Two steps back

Hard times in banking and financial industries hits salaries, too

	1989		1990	
Average salaries	Banking	Securities	Banking	Securities
CIO/VP/Director of IS	$87,818	$83,311	$77,463	$78,404
Project manager	$50,950	$55,615	$49,281	$49,250
Senior programmer	$36,237	$32,731	$33,053	$33,231

Source: CW Salary Survey — CW Chart: Doreen St. John

CONSULTING OPPORTUNITIES

Here There Everywhere

The Computer Merchant, Ltd. has become the recognized source for software consulting excellence among Fortune 500 Companies. Due to expanding demand for our services, the following opportunities currently exist for experts with a minimum of 3 years experience:

CICS/ASSEMBLER (Long Term)
DATACOM/IDEAL
TELON P/A
DB2/CICS
STRATUS/TANDEM
SMARTSTAR P/A's
INGRES/DBS
UNIX-KERNAL LEVEL
SAS-MACRO/SAS GRAPH (Long Term)
UNISYS/LINK
LAN MANAGER/3+ OPEN
MacINTOSH/4th DIMENSION

For more information on The Computer Merchant Ltd.'s professional services and opportunities, contact us by mail, fax or call:

(617) 878-1070

The Computer Merchant, Ltd.
80 Washington Street, Building E
Norwell, MA 02061
FAX (617) 878-4712

PROGRAMMERS
The best in the Sunbelt
Contract Assignments
$24-28/Hr.
+ Per Diem.

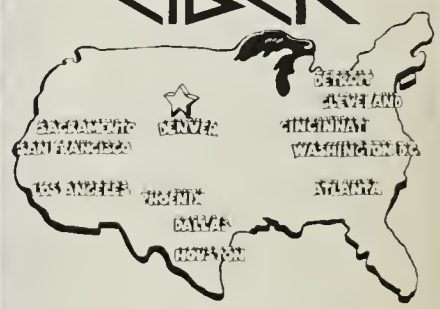
Jr. to Sr. level programmers with 1+ yrs. exp. in IBM, 'C' PL-1 ASSEMBLER, & other high-level languages. Contract assignments 12-18 mos.+ $24-28/Hr. + per diem +

Contact: Al Madsen, C.E.C.
CORPORATE PERSONNEL CONSULTANTS, INC.
P.O. Box 221739
Charlotte, NC 28222
(704) 366-1800
FAX (704) 366-0070

★ GET OUT ★ OF TOWN
NATIONWIDE OPPORTUNITIES

YOUR HOME TOWN MAY HAVE MANY JOBS, BUT NOT YOUR CAREER OPPORTUNITY. THE COMPUTER-TECH NETWORK OF 60 NATIONAL COMPUTER SEARCH AGENCIES SPECIALIZES IN THE PLACEMENT AND PAID RELOCATION OF COMPUTER PERSONNEL TO ALL AREAS OF THE U.S.A.
(216)-356-9990
FAX #(216)-356-9991
TOLL-FREE 1-800-752-3674
COMPUTER TECH NETWORK
21010 Center Ridge Rd.
Rocky River, Ohio 44116

CIBER



DB2 / TELON

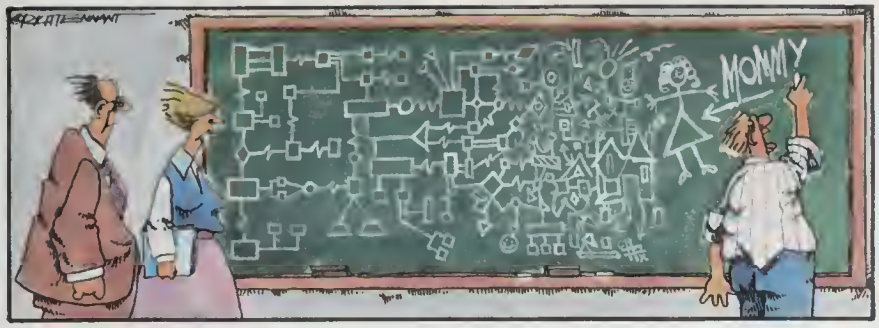
Join CIBER in TEXAS, where opportunities to grow and develop are yours for the asking. A competitive salary, comprehensive insurance plan, tuition reimbursement, relocation assistance, and CIBER's taxdeferred 401K Savings Plan are among CIBER's benefits.

CIBER's consultants use their skills in a wide range of industries, platforms, operating systems and languages. CIBER services mainframe, mini, and microcomputer environments. We urgently need data processing professionals with DB2, TELON or ADABAS Natural in DALLAS and HOUSTON.

Opportunities are also available in all CIBER locations if you have at least two years current technical experience, including exposure to fourth generation languages, relational databases, software packages, and leading edge technology. Take the first step on a new and rewarding career path...CALL, MAIL, or FAX us a copy of your resume and salary requirements today.

CIBER, Inc.©
2121 San Jacinto Tower
Suite 1960
Dalas, TX 75201
(214) 754-1810
(214) 754-1816(Fax)

CIBER, Inc.
1600 Smith
Suite 4225
Houston, TX 77002
(713) 658-0481
(713) 658-1019 (Fax)



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $38.95* per year — a savings of 62% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: $48 per year

* U.S. Only Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Distr./Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____

   (Please specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Mgrs., Suprv. of Programming, Software Dev.
   - 32. Programmers, Software Developers
   - 60. Sys. Integrators/VARs/Consulting Mgt.

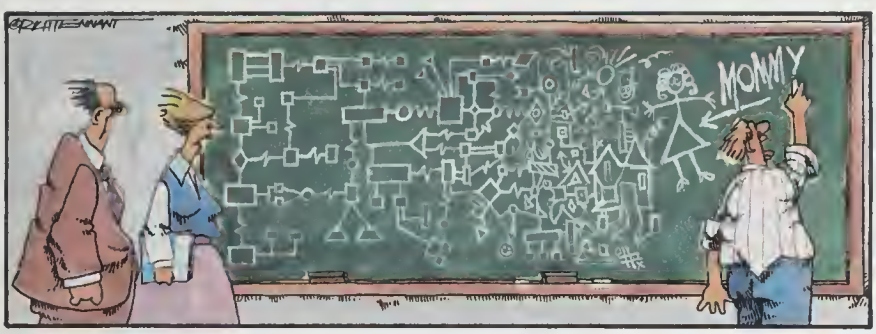
   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales & Mktg. Management

   OTHER PROFESSIONALS
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educator, Journalists, Librarians, Students
   - 90. Others _____

   (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
   - F. No Computer Involvement

E4042B-3



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $38.95* per year — a savings of 62% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Distr./Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____

   (Please specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt., Dir./Mgr. PC Resources
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Mgrs., Suprv. of Programming, Software Dev.
   - 32. Programmers, Software Developers
   - 60. Sys. Integrators/VARs/Consulting Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales & Mktg. Management

   OTHER PROFESSIONALS
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educator, Journalists, Librarians, Students
   - 90. Others _____

   (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
   - F. No Computer Involvement

E4042B-3

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

Computer Professionals *Expect* NCA To Provide A Bright New Future For Them... and we do it every day!

We are the nation's largest network of independently owned computer placements specialists. We've been in business far longer than any similar network. So it shouldn't be surprising that we've developed thousands more computer employers than anyone else.

When you come to an NCA firm you can review a great many exceptional career opportunities for which you may be qualified...each of which is completely detailed with "inside information" on job requirements, compensation, benefits, etc.

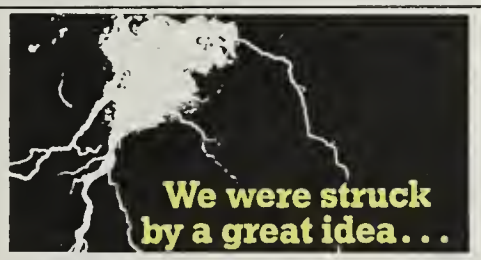
Come in. Call. Or mail your resume to the NCA firm nearest you. No charge to you for any of our services. Confidentiality is assured. Expect to see more opportunities at NCA...and you won't be disappointed.

National Computer Associates

ATLANTA: DataPro Personnel Consultants
1050 Crown Pointe Pkwy Suite 430
Atlanta GA 30338 (404) 392 9990
BOSTON: Robert Kleven & Co Inc
P.O. Box 636
Lexington MA 02173 (617) 861 1020
CHICAGO: Thomas Hertz & Associates
150 North Wacker Drive Suite 1700
Chicago IL 60606 (312) 977-1555
CINCINNATI: Task Group
7875 Reading Road
Cincinnati OH 45237 (513) 821-8275
CLEVELAND: Innovative Resources Corporation
Beachcliff Executive Centre
1340 Depot Street Suite 210
Rocky River OH 44116 (216) 331-1757
COLUMBUS: Michael Thomas Inc
450 W Wilson Bridge Road Suite 340
Worthington OH 43085 (614) 846 0926
DALLAS: DataPro Personnel Consultants Inc
13355 Noel Road Suite 2001
Dallas TX 75240 (214) 661-8600
DENVER: Abacus Consultants Inc
1777 South Harrison Street Suite 404
Denver CO 80210 (303) 759 5064
DETROIT: Electronic Systems Personnel
3000 Town Center Suite 2580
Southfield MI 48075 (313) 353 5580
GREENSBORO: DataMasters
P.O. Box 14548
Greensboro NC 27415 4548
(919) 373-1461
HOUSTON: Career Consultants Inc
1980 Post Oak Boulevard Suite 1050
Houston TX 77056 (713) 626 4100
KANSAS CITY: OP Career Associates
6405 Metcalf Suite 502
Shawnee Mission KS 66202 (913) 236 8288
LOS ANGELES: Superior Resources Inc
22653 Pacific Coast Highway Suite 1 106
Malibu CA 90265 (818) 884 3000
MEMPHIS: Information Systems Group
4646 Poplar Suite 417
Memphis TN 38117 (901) 684 1030
MIAMI: Data Sciences Personnel Inc
P.O. Box 8577
Hollywood FL 33084 (305) 434 6112
MILWAUKEE: EDP Consultants Inc
Chancellory Park II Suite 350
350 N. Sunnyslope Road
Brookfield WI 53005 (414) 797 8855
MNPLS./ST PAUL: Electronic Systems Personnel
701 Fourth Avenue South Suite 1800
Minneapolis MN 55415 (612) 338-6714
NEW JERSEY: Systems Search
2040 Millburn Avenue
Maplewood NJ 07040 (201) 761-4400
NEW YORK: Botal Associates Inc
7 Dey Street Suite 410
New York NY 10007 (212) 227-7370
PHILADELPHIA: Systems Personnel, Inc
115 West State Street
Media PA 19063 (215) 565-8880
PHOENIX: Professional Career Consultants
4725 North Scottsdale Road Suite 209
Scottsdale AZ 85251 (602) 274-6666
PITTSBURGH: KCS Computer Services Inc
400 Penn Center Blvd Suite 320
Pittsburgh PA 15235 (412) 823-8632
ROCHESTER: Traynor Confidential Ltd
10 Gibbs Street Suite 400
Rochester NY 14604 (716) 325-6610
SAN DIEGO: Technical Directions Inc
8880 Rio San Diego Dr Suite 1025
San Diego, CA 92108 (619) 297-5611
SAN FRANCISCO: Professionals for Computing Inc
455 Market Street Suite 1850
San Francisco CA 94111 (415) 957-1400
SEATTLE: Houser, Martin Morris & Associates
110 110th Avenue N.E. C-90015
Bellevue, WA 98009 (206) 453-2700
STAMFORD: Hipp Waters Professional Recruiting
707 Summer Street
Stamford CT 06901 (203) 357-8400
ST. LOUIS: Executive Career Consultants
795 Office Parkway Suite 100-CW
St. Louis, MO 63141 (314) 994-3737
SYRACUSE: The CFA Group Inc
5790 Widewaters Parkway
Dewitt, NY 13214 (315) 446-8492
WASHINGTON D.C.: Technical Recruiters
8701 Georgia Avenue Suite 607
Silver Spring MD 20910 (301) 495-3111
AUSTRALIA: For information, contact the NCA firm nearest to you
LONDON, England: For information contact the NCA firm nearest to you

Software Localization Manager for Italy, International Product Group. By November 14th please send resume to: Employment Security Department, ES Division, Att: Job # 187721-H, Olympia, Washington 98504. Job Description: Manages subgroup of software company to localize U.S.-designed and produced software for microcomputers for Italian market. Works with software engineers and international testers to implement design changes. Manages localization associates, translators, editors, typesetters, printers, and marketing personnel to produce Italian manuals and marketing material to accompany Mac/PC Mail and Powerpoint software. Communicates with company subsidiaries in Italy re software and marketing needs. Requirements: B.A. Business Administration with specialization in Marketing or Economics. Must be able to fluently speak, write and read Italian and English. Must be familiar with current colloquialisms, idioms and jargon of Italian, especially as it pertains to business usage. Six months work experience in localization of business automation products for Italian market. Must heve proof of legal authority to work in the United States. Job location: Redmond, Washington. Salary: $33,500-36,000 per annum, depending on experience. 40 hours per week, flex time. EOE

Maneging Director Systems Eng. E.D.P. w/MS Computer Science plus 6 mths. Component sales/maintenance w/marketing responsibilities to control complete operations of PC distributor via strategy/policy development. Reviews and approves sales persons recommendations of particular products to meet specific needs. Regular contact with parent/manufacturer in Teiwan re: specs and technical application. Chinese fluency required. GPS, WP, D-BASE, Harvey Graphic system maintanance, NOVELL and other netware, supervises 30 employees in sales, warehousing, marketing, accounting, technical department/directs activities of sales manager/reps and teams. $50K. 8:30 a.m. - 5:00 p.m./40 hrs. Resume only to: Job Service of Florida, 701 S.W. 27th Avenue, Rm. 1S, Miami, FL 33135. Ref: Job Order No.: FL 034S433.



and the results have been electrifying. **Business Week** recently listed CISCORP as the 20th fastest growing high technology company in America during the '80s. Our **great idea** has been an aggressive approach to developing customized systems focused on SQL development across environments as a complete project solution

Strategic partnerships with prestigious hardware and software manufacturers have placed CISCORP on the leading edge of technology. Our extremely forward thinking environment specializing in relational database, 4th generation language application development and software engineering requires us to continuously seek top-notch **Project Managers** and **Programmer/Analysts** experienced in

Ingres, Oracle, DB2, OS2/Presentation Manager, Adabas, Tandem/NSSOL, VAX/RdB, Sybase, Progress, Mantis/Supra, or Macintosh/DAL.

We offer limitless opportunity for personal and professional growth, as well as an excellent compensation/benefits program. If you are ready to bolt to our positive career environment, please submit your resume in confidence to **CISCORP, Penn Center West II, Suite 430, Dept. 0170, Pittsburgh, PA 15276, 800/969-0099 or 412/787-3070 (fax).**

The vision of tomorrow's technology — TODAY

Atlanta • Baltimore • Cleveland • Dayton • Philadelphia • Pittsburgh • Silicon Valley

CISCORP

An Equal Opportunity Employer

ANALYSTS • PROGRAMMERS • HW/SW

In a Slow Market, You Need A Quick Employment Service

If you have marketable skills, together with reasonable geographic and salary requirements, your resume will be on its way selectively, to our applicable contacts among our 1000+ client companies and 200+ affiliates nationwide, ***within 24 hours after we receive it.*** No cost or obligation to you, no sales pressure

Our clients seek 2 years minimum professional experience, stable work history, good technical references, and U.S. citizenship or green card

TO APPLY: Mail or FAX resume or call Howard Levin.

RSVP SERVICES

RSVP SERVICES
Dept. C, Suite 614, One Cherry Hill Mall, Cherry Hill, NJ 08002
800-222-0153 or FAX: 609-667-2606 (refer to Dept. C)

FLORIDA
LOOKING FOR A CAREER MOVE WITH GROWTH POTENTIAL?

Our Fortune 100 customers have asked us to find professionals with 2+ years experience who want to learn new skills and work in high tech environments.

COMPUTERPEOPLE's staff is currently working on assignments involving

IBM	APPLICATIONS
CICS/COB	M&O
OB2	MSA
ALC	AA/OCS
IMS/OL1	
IOMS	**PC SYSTEMS**
AOR/IOEAL	LAN
FOCUS	D-BASE
IMS/OB2 OBA	CLIPPER
TANDEM	OOS/"C"
SCOBOL/ PATHWAY	INFORMIX
TAL	**S/E**
COMM S/E	UNIX C COMM
DEC	AOA
VAX/VMS	**GENERAL**
VMS/ORACLE	WANG/COBOL
RSX 11M	CASE TOOLS
VMS/AOA	

Should you desire to be a member of a strong team and possess high level skills in one of the above areas, call or send resume to

COMPUTERPEOPLE, Dept 505
12225 28th Street N
St. Petersburg, FL 33716
800-888-1084
813-573-2828

~~20 N. Orange Avenue, Ste 1405~~
Orlando, FL 32801
800-888-1084

2005 W. Cypress Creek Rd., Ste 3
Ft. Lauderdale, FL 33309
800-777-8603
305-771-8603

COMPUTERPEOPLE
"FLORIDA'S LEADING PERMANENT STAFFING AND CONSULTING COMPANY"

Northern California

Near mountains, ocean, Tahoe, Yosemite.

Contractors & Full Time

DB2, CICS, VSAM, IDMS IMS, CSP, ESA

- **Data Base Managers**
- **Director Data Center**
- **Data Security Analysts (RACF)**
- **Project Managers**
- **Programmer Analysts**
- **Systems Programmers**
- **Systems Analysts**
- **Data Base Analysts**

Free 1990 salary survey available. Send resume.

Chuck Klein & Assoc.
3840 Thorson Dr.
Placerville, CA 95667
(916) 644-6396

CA & AZ CONTRACTS

CONSULTANTS WANTED

P. Murphy & Associates, Inc.

4405 RIVERSIDE DRIVE, SUITE 100
BURBANK, CA 91505
(818) 841-2002 (714) 552-0506
FAX: (818) 841-2122

Why the best call Compaq home.

At Compaq, our common-sense approach to business has helped make us a world leader in advanced personal computers. But it's our commitment to people, our relentless dedication to building a quality work environment, that's the heart of our success. At Compaq, our people find an environment where they're encouraged to put their greatest abilities to the test - pushing the limits of technology, and finding practical solutions to the needs of today's PC user.

Why do the best call Compaq home? Because Compaq brings out the best in its people.

Business Software Development

Perform distributed computing in a client/server environment using 3/4 GL languages and relational/SQL database technology. Provide systems development in a multi-user networked environment, including LAN Manager, NetWare and Vines. Develop and support manufacturing, financial, sales/marketing and engineering systems in an integrated hardware platform.

Network/Operating Systems Technical Support

Plan, install and support UNIX, OS/2, Windows, VMS and MPE/XL. Programming knowledge required. Develop strategy, design and support of NetWare, LAN Manager and Vines network operating systems. Design world-wide networks using TCP/IP and OSI.

Data Network Engineering

Design and develop world-wide PC-based network system using high-speed multi-protocol routers and LAN technologies. Design Ethernet systems using twisted-pair technology and define routing systems to support IP, IPX and Vines routing. Develop and maintain Compaq's five-year data communication plan, utilizing the COMPAQ SYSTEMPRO.

Compaq offers competitive salaries, comprehensive benefits, and an unequaled work environment. If you are interested in one of these unique opportunities, simply submit your resume, stating the position for which you wish to be considered, to: *Compaq Computer Corporation, Dept. CW1015-CM, P.O. Box 692000, Houston, Texas 77269-2000.*

Compaq is an affirmative action employer, m/f/h/v.

COMPAQ

AS/400 S/38

GET TO THE HART OF THE BUSINESS...

...With Whittman Hart, the largest diversified technical services company (dedicated strictly to the AS/400 and S/38 systems) in the country. Providing technical support to many of the top Fortune 20 companies in America, we are the consulting experts, committed to mastering technologies, attending to details and creating solutions. Our accelerated growth and phenomenal success have created a need for talented Data Processing PROFESSIONALS to share in a future of significant challenge and reward in a highly progressive team environment.

We currently require individuals with 2+ years solid System 38, or AS400 experience, RPG III and proficiency in any of the following:

- **Technical Consulting**
- **Design**
- **Education & Training**
- **Data Communications**
- **Project Management**
- **Product Development**

POSITIONS ARE CURRENTLY AVAILABLE IN CHICAGO, LOS ANGELES AND INDIANAPOLIS.

Get to the HART of challenge and reward at Whittman Hart. We offer one of the finest compensation packages in the industry, including high earning potential, project diversity, incentives, paid insurance coverage, relocation allowance and other impressive benefits. Please send your resume in strict confidence to: **Jared Bobo, Director of Recruiting, Whittman Hart, 377 East Butterfield Road, Suite 425, Lombard, IL 60148. (708) 971-2270.** Equal Opportunity Employer M/F.

Whittman-Hart

The Leader in IBM Midrange Solutions

WHEN IT COMES TO RESOLVING EMPLOYEE CONCERNS.. 1500 HEADS ARE BETTER THAN ONE.

There is no reason to work without the support of New England's leading association of Human Resources Professionals. NEHRA is your best local source for networking, new trends, surveys, seminars, vendor information, and much more. Why work alone when you can put 1,500 heads together?

To join, just call Peggy Erdlen at 617 235-2900. **NEHRA FOR THE 90s**

NORTHEAST NEHRA HUMAN RESOURCES ASSOCIATION

Northeast Human Resources Association
20 William Street, Suite G20
Wellesley MA 02181

Computer Engineer, Senior. Develop IBM PC/XT/AT compatible BIOS (Basic Input Output Systems) known as AMI-BIOS for IBM PC/XT/AT compatible machines, using 8088/80286/80386/80486 assembly languages. Develop IBM EGA/VGA compatible graphics bios, using 8086 assembly language. Develop IBM PS/2 SYSTEM 30 compatible ROM BIOS for IBM PS/2 SYSTEM 30 compatible machines, using 8086 assembly language. Develop AX BIOS (according to Japanese specifications) & JEGA BIOS (JAPANESE EGA GRAPHICS) for AX-SYSTEMS, using 8086/80286 assembly language. Modify and customize BIOS products, for different types of IBM PC/XT/AT compatible motherboards and EGA/VGA graphics cards. Develop IBM PS/2 SYSTEM 50/60/70/80 compatible ROM BIOS for IBM PS/2 50/60/70/80 compatible machines, using 80286/80386 assembly 70/80 languages. Work on EISA BIOS & EISA CONFIGURATION UTILITY (according to EISA specification) for EISA based systems, using 80386/80486 assembly language. Requires in depth knowledge of INTEL 8086/8088 & 80286 processor chips and specifically their assembly language (including associated linking and debugging programs); microprocessor operating systems such as MS-DOS; BIOS/operating system interfacing; reverse engineering of BIOS object code modules; compiler construction techniques including parsing, IBM PC-type ROM-BIOS, EGA Graphics BIOS, as well as PC architecture and integration of add on boards. Knowledge may be obtained by demonstrated work experience or university coursework using such techniques of not less than three years. B.S.E.E. or Computer Engg. 4 yrs exp in job or 6 yrs as System Software Engineer. $1250/wk. Apply in person or send resume in dup to Georgia Department of Labor, Job Order #GA 5450743, 1535 Atkinson Rd., Lawrenceville, GA 30243 or to the nearest Georgia Job Service Center.

FLORIDA OPPORTUNITIES

CBA, Florida s premier consulting company, seeks experienced data processing professionals interested in the personal and professional rewards of working in the tropical southeast. CBA offers an excellent benefit package in addition to a reputation of professional service, integrity and leadership. The Florida market is active and growing and CBA has immediate and upcoming needs. Professionals skilled in any of the following are encouraged to contact by resume or phone:

COMPUTER BUSINESS ASSOCIATES, INC.

FOCUS	BANK/REAL ESTATE
ORACLE	VOICE RECOGNITION
IMS/DL1	SUN WORKSTATION
PCS/ADS	4GL EXPERTISE
CSP/DB2	MANUFACTURING
DB2/SQL	CASE TOOLS
CICS/DL1	IDMS/ADSO
IMS/DB/DC	MSA & M&D
INSURANCE	TERADATA
INFORMIX/4GL	PACBASE
MUTUAL FUNDS	INGRESS
AS/400, SYS/38	STRATUS
ADABASE/NATURAL	ACP/TPF
ADR/IDEAL/DATACOM	COPICS

TANDEM, COBOL, SCOBOL, PATHWAY

TANDEM, TAL, COMMUNICATIONS

Orlando Office
2500 Maitland Ctr Pkwy
Suite 104
Maitland, Florida 32751
407-660-0440
FAX 407-660-2103

Tampa Office
500 N. Westshore Blvd.
Suite 445
Tampa, Florida 33609
813-287-2100
FAX 813-287-2954

PROGRAMMER

SYSTEMS PROGRAMMER

Thiokol Corporation, a leader in the solid fuel propulsion field has an opening for a VM Systems Programmer. Responsibilities entail continued maintenance of an operational VM/SP system on a 4300 class system. Software modules include RSCS, VTAM/SNA, SQL/DS, GDDM, Fortran and COBOL, FOCUS and WordPerfect 370 running with ACF2 security. In addition, position involves responsibility for migration to new releases of software, systems regeneration, performance monitoring and participation in a Corporate Wide Area and PC-based Local Area Networks. This is a Senior position opening and only personnel with applicable experience need apply.

Those qualified should forward a resume including salary history to:

THIOKOL CORPORATION
P.O. Box 241
55 Thiokol Road
Elkton, Maryland 21921
Attn: Human Resources

Equal Opportunity Employer
M/F/V/H

TOP PAY FOR TOP PERFORMERS

Established in 1982, Devon Consulting specializes in responding to the data processing consulting requirements of Pennsylvania, New Jersey & Delaware companies. Our clients range from Fortune 500 companies to small data processing shops.

We are currently seeking experienced contract professionals with the following skills:

IN NEW JERSEY

- NOMAD
- INFOPAC
- MSA INTERNALS
- PANSOPHIC ON AS/400
- ARTHUR ANDERSON DCS
- CRAY
- INQUIRE
- IDMS

IN PENNSYLVANIA

- SYBASE
- IMAGE PLUS
- SEQUENT/DYNIX
- UNISYS INTERNALS

Many other technical skills in frequent demand.

Please call or send resume to:

DEVON CONSULTING
435 DEVON PARK DRIVE
SUITE 410
WAYNE, PA 19087
215-964-2700

Fax #215-964-2708

Member NACCB

ADABAS/NATURAL EXPERTS

Career opportunities to work with the Industry Leader in Systems Software.

- DATABASE ADMINISTRATORS
- APPLICATION PROGRAMMERS
- SYSTEMS PROGRAMMERS

Qualifications:

- ADABAS/NATURAL Experience
- IBM Mainframe Software Experience
- Degree Highly Desirable

Salary commensurate with experience. Excellent benefits and growth opportunities.

SOFTWARE AG FEDERAL SYSTEMS
11130 Sunrise Valley Drive, #200
Reston, VA 22091
Attn: Judy Neff, Dept. OC8CW

(703) 620-0100 EOE Fax# (703) 620-9347

Resources International Inc.
Information Technology Consultants

ANALYSTS / PROGRAMMERS

Opportunity to live and work in one of the most desirable and affordable growth areas in the country. Resources International Inc., headquartered in Atlanta, Georgia has 14 openings in the Southeast. We want to talk with you if you have over three years related software experience.

- AS/400
- RPG II, III
- COPICS
- MAPICS
- IBM MANTIS
- ADABAS
- NATURAL 2.0
- COBOL
- VAX
- ORACLE
- C
- RDB
- ACMS
- DEC FORMS
- ALL-IN-1
- WINDOWS

WE OFFER COMPETITIVE SALARIES, PAID VACATION AND HOLIDAYS. TUITION REIMBURSEMENT AND COMPREHENSIVE MEDICAL BENEFITS

Please send resume, call or FAX: Anne Perreyclear or Pete Wyatt
570 Colonial Park Dr. • Suite 301 • Roswell, GA 30075
Tel: 800-783-7468 (404) 594-7500 FAX (404) 587-1932

ORACLE DATABASE ADMINISTRATOR
STUDENT INFORMATION SYSTEMS
UNIVERSITY OF CALIFORNIA, DAVIS

To effectively manage the SCT/ORACLE database, the DBA will control the installation of the new system, determine access, proportion resources, guarantee security, monitor resource usage, provide consultation and assistance to users, and oversee conversion and adaption of the new SCT software onto the hardware platform.

Requires strong experience in the management of a large scale ORACLE database and proven expertise in new system development. Knowledge of Student Systems Applications desirable.

Salary negotiable, based on qualifications and experience.

Submit a letter of interest, resume and the names and telephone numbers of three references to James H. Abele, Associated Director, Administrative Information Systems, University of California, Davis, Davis, CA 95616 by November 5, 1990.

EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

The only thing more impressive than the project itself is the opportunity it creates.

Aetna Life & Casualty, the 15th largest corporation in America, has embarked on a project that will directly affect each of our insurance operating divisions and the corporation as a whole.

Once online, the AEgle General Ledger system will give each of our divisions more direct control over their financials, substantially enhancing their efficiency and competitive edge.

At the heart of this system is the general ledger application package of Walker Interactive Software and our own advanced large scale IBM mainframe environment. Our team of dynamic professionals, committed to the use of emerging technologies, will lead the project.

To make the most of our investment, we're expanding our team with professionals fluent in the use of Walker Interactive Software and experienced in large scale projects.

Systems Advisors/ Senior Software Consultants

You'll participate in the technical design aspects of the project, analyzing and testing the Walker system to determine the best system solution to our business specifications.

To be considered, bring us at least five years' experience with Walker Interactive Software general ledger applications.

Senior Analyst Programmers/Specialists

You, too, will participate in technical design and programming for the project. You will need at least two years' experience with Walker Interactive Software general ledger applications.

Common to all positions is the need for technical proficiency with VSAM, CICS, COBOL, JCL and VM, an appropriate college degree, strong analytical, interpersonal and communication skills, and the ability to work as part of a close knit team.

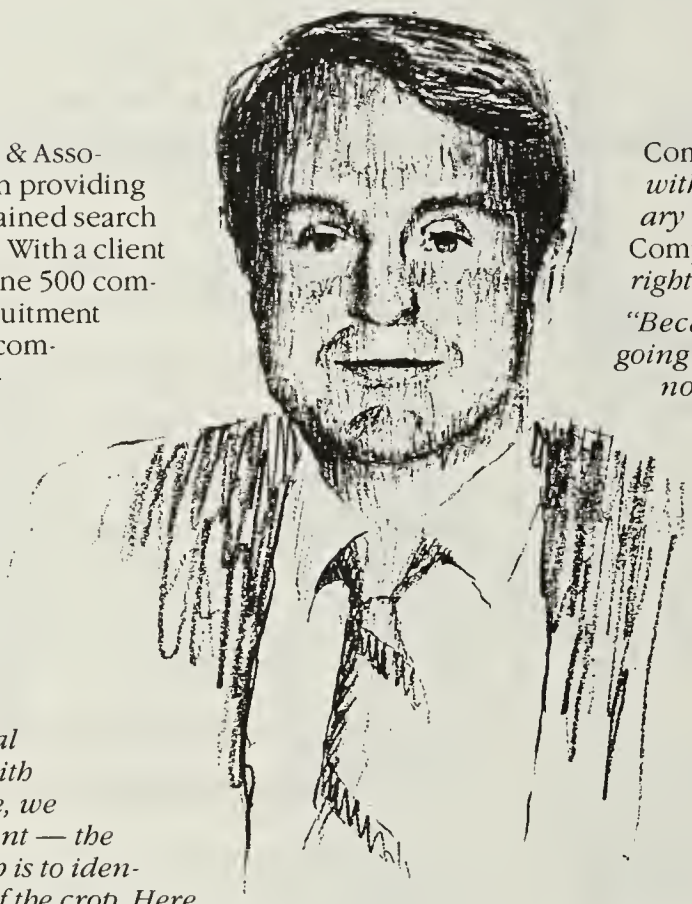
Significant sign-on bonuses, full relocation expenses, highly competitive salaries, exceptional benefits and a state-of-the-art environment are all possible for the best and brightest. If you'd like to be considered, contact us today. Send your resume to: David Brogan, YF56, Financial Staffing, Dept. 3726A, Aetna Life & Casualty, CityPlace, Hartford, CT 06103. Your reply will be acknowledged and held in strict confidence. Principals only; no phone calls, please.

Aetna

Aetna is an Equal Opportunity, Affirmative Action Employer.

"Computerworld is our primary source to find the right pool of top technical talent."

Bill Young
President
Bill Young & Associates



For over a decade, Bill Young & Associates of Fairfax, VA, has been providing cost-effective contingency and retained search services to companies nationwide. With a client base of small, mid-sized and Fortune 500 companies, the firm specializes in recruitment for data processing, engineering, communications, consulting, manufacturing, financial services and defense. On-site consulting and complete administrative/office support placement are offered by other company divisions as well. As explained by President Bill Young, they have a product to sell — and that product is people.

"I consider myself to be a technical talent scout. Every year we talk with over 50,000 professionals. Of those, we actively work with about 10 percent — the 5000 or so top candidates. Our job is to identify the best qualified, the cream of the crop. Here, Computerworld *serves as a valuable tool in helping us find top talent for new openings — and new openings for available talent.*

"The initial and most immediate goal of our recruitment advertising is to fill requisitions for existing positions. Computerworld *is our primary source to find the right pool of top technical talent. And, with* Computerworld, *we also get a secondary residual value that's difficult to measure. As a direct result of our recruitment advertising in* Computerworld, *we've gotten specific retainers with new client companies — plus secondary referrals up to 12 and 18 months later.* Computerworld *definitely gets us talking to the right people.*

"Because Computerworld *is the pulse of what's going on in the industry, the right people take notice. So when our recruitment advertising appears in* Computerworld, *we know we're telling the right people about our full-service package that encompasses everything from initial screening and resume preparation to travel arrangements, relocation issues, salary negotiations — even personnel practices and outplacement.*

"Looking ahead, we hope to expand our search service into the global marketplace. When the time is right, we'll be counting on Computerworld *to help Bill Young & Associates target international recruitment prospects as well. As long as we're in the business,* Computerworld *will always hold a prominent position on our recruitment advertising schedule."*

Computerworld. We're helping serious employers and qualified information systems, communications and PC professionals get together in the computer community. Every week. Just ask Bill Young. For all the facts on how *Computerworld* can put you in touch with qualified personnel, call your local *Computerworld* Recruitment Advertising Sales Representative today.

COMPUTERWORLD

The weekly newspaper of record for computer professionals.

Boston: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700
New York: Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090
Washington D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115
Chicago: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (312) 827-4433
Los Angeles: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 250-0164
San Francisco: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 250-0164

An IDG Communications Newspaper

*** IMMEDIATE CONSULTING OPPORTUNITIES:**

SQL/DS/CSP in Florida

McDodge A/P

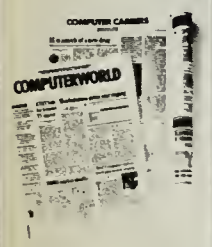
The Allegiance Group
Call Sun or anytime collect
(212) 421-7255
Send res to: Dan Greenburg
1 Penn Ptaza, Suite 100,
New York, NY 10001

ENGINEERING ANALYST; Wood cliff Lake, NJ: Provide analysis and programming assistance to scientists and engineers in the conversion of scientific and engineering problems to computer understandable fenguages in IMS Db/Dc data base management systems. Prepare mathematical simulation of physical or chemical systems under study. Reduces problem to computer processable form. 40 hr./wk. (9am-Spm) $41,000.00/yrly. B.S. Math. 1 yr. exp. req'd. Background in C, Unix, IMS & CICS languages. Must have legal authority to work in the U.S. Resumes in duplicate by 11.1S.90 to: HACKENSACK ES OFFICE, 60 State Street, Hackensack, NJ 07601. J.O. #0943448 No Fee Charged

---

This Space for HIRE! CALL:

800-343-6474



in MA., 508-879-0700, ask for John Corrigan, Vice President Classified Advertising.

Computerworld

Weekly.
Regional.
National.

And it Works!

RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following: IBM COBOL; CICS; IDMS; IMS; ORACLE; Progress; Ideal; Datacom; DB 2; UNIX; HOGAN; Assembler; AS400; DEC/VAX Cobol or Fortran; 2167; Ada; S/W QA or Test; POS; Mfg.; Banking; Insurance; MVS, DOS, IMS or CICS Systems Progrs; DEC/VAX Systems Mgrs; DASD Mgr; Adabas/Natural; Banyon; OB Analysts. Partial listing of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Suite 7
Raleigh, NC 27609
(919) 782-3024
FAX (919) 783-0492

PROGRAMMER/ANALYSTS & SYSTEMS PROGRAMMERS

FOR CAROLINAS AND SOUTHEAST

Numerous opportunities exist for on-line and data base applications P/A's as well as systems programmers and DBA's Fee Paid Please call or send resume to

Keith Reichle, CPC
Systems Search, Inc.
203 Heritage Park
Lake Wylie, SC 29710
803/831-2129

(Local to Charlotte, NC)

CAREERS in the CAROLINAS

for
P/A, S/A, S/P, DBA
Salary ranges from
$30,000 - $50,000

If you have at least two years experience on IBM MF, AS/400, or DEC/VAX

send your resume or call

i.s.careers, inc.

p.o. box 353B5
greensboro, nc 27425
919/66B-9846

TECHNICAL TRAINER/MGR

Growing, dynamic consulting company requires experienced, hands-on instructor and manager. Ability to provide vision and direct operations in an expanding training division. IBM mainframe experience is essential. DB2 or relational mainframe database experience is required.

Send resume to:

KNAUERCONSULTING
100 Bush Street
Ste. 750, Dept. CW1015
San Francisco, CA 94104

Great CONSULTING Assignments! and Exceptional FULL TIME Opportunities

Call & send your resume to

MIMI SIMON ASSOC.
90 West Street, Suite 1105
New York, NY 10006

(212) 406-1705
Fax # (212) 406-1768

INGRES/INFORMIX/C

Database developers & programmers 2 yrs experience with **INGRES, INFORMIX,** OR C. Development environment **VAX/VMS** and/or **UNIX.** Full-time PGH, PA based positions with competitive compensation & benefits package.

Send resume & salary requirements to:

ENSYS
3424 William Penn Highway
Pittsburgh, PA 15235
Attn: Dir. of CS & A

Data Processing

XEROX

Systems Analyst Electronic Printing Systems

Xerox Corporation is the leading developer of advanced, intelligent electronic printing systems. Career opportunities now exist for experienced Systems Analysts in the LA basin.

Primary responsibilities will include providing technical support to our marketing effort and serving as a consultant to our customers; designing and implementing printing systems solutions in a variety of software and hardware environments; preparing analysis of customer printing needs; verifying connectivity options; preparing sample print applications; serving as technical focal point in customer presentations.

The ideal candidate will have a degree in computer science and a broad range of knowledge or experience in mainframe environment (IBM MVS/JES2, JES3, VM-RSCS, DOS/VSE-POWER), applications software (DCF, GDDM, SAS, CICS), data communications (VTAM, NCP, SNA/SDLC, BSC), networks and peripheral hardware. AFP experience would be an asset. Prior experience with Xerox Electronic Printing Systems a plus.

Xerox can offer you an excellent salary and a comprehensive benefits package. Xerox also provides a progressive marketing and technical training program. For prompt, confidential consideration, please send your resume with earnings history to: **Hiring Center Manager, Xerox Corporation, Western Region, 1851 East First Street, Suite 1500, Santa Ana, CA 92705.** Xerox is an equal opportunity employer.

IS PROFESSIONALS

Unprecedented growth has created a need for experienced, talented Programmers, Senior Programmer/Analysts, DBA's and Systems Managers Current needs include

IBM
- CICS, DB2
- NATURAL/ADABAS
- AS
- CICS, S2K
- IDMS, ADS/O
- IMS DB/DC, CICS, SQL
- EASEL, PS2

DEC
- VAX SQL FORMS 3.0, C
- VAX INGRES, ABF, FORTRAN
- VAX COBOL, Smartstar, RDB
- NATURAL/ADABAS
- Q or L Clearance, FORTRAN, DECNET

We offer state-of-the-art work environments, excellent compensation, relocation and professional visibility Send your resume TODAY! (Degree preferred).

AMERICAN COMPUTER PROFESSIONALS
140 Stoneridge Drive
Suite 350
Columbia, SC 29210
(800) 933-9227
EOE

A Terrific Opportunity

Computer Consulting Group, one of the **Southeast's** fastest growing contract programming and consulting firms, has immediate openings for talented Programmer/Analysts with 2 or more years experience Excellent salary & benefits package We're especially seeking

NATURAL/ADABAS
CICS/COBOL
IMS DB/DC
IDMS/ADSO
TECH. WRITERS
LIFECOM
DB-2
SYS. PROGRAMMER
VAX/FORTRAN/COBOL
UNIX/C
PL-1/COBOL
VAX/C/INGRES
AS400/COBOL
I-CAO
IDEAL/DATACOM

Computer Consulting Group
Contract Professional Services
Research Triangle Area
4109 Wake Forest Rd
Suite 307
Raleigh, NC 27609
1-800-222-1273
(803) 738-1994
FAX (803) 738-9123

COMPUTER PROGRESS UNITED
$40,000 to $60,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for **P/A** in **Kentucky, Ohio, Indiana,** and **Tennessee. We are the DB2 Specialists!**

TELON
DB2 ■ IMS ■ CICS

Send resume or call
Computer Progress United
12730 Townepark Way
Louisville, KY 40243
(502) 245-6533

MAPICS COPICS

All jobs are not created equal! Call today and put my 10 years experience to work for you locating your career move to exciting new development opportunities. Blue chip benefits/paid fees and relocations.

Jane Green, CPC
803-281-0685
FAX 803-281-0687

EXECUTIVE TECHNICAL MGR

A major Bay Area computer consulting firm is looking for an Executive Technical Manager. Responsibilities include management of data processing professionals, systems development and integration, along with technical marketing support. Knowledge of DB2 and CASE tools preferential.

Please submit your resumes to:

CW-4345S
Computerworld
Box 9171
Framinghem, MA 01701-9171

TENNESSEE

MANAGER with 7 to 10 years in manufacturing, IBM 3090 MVS, MRP, ADS/O, IDMS/R.

S/A, P/A and Programmers CICS/VSAM, COBOL, IDMS.

Danny M. Wall
The Southwestern Co.
P.O. Box 305140
Nashville, TN 37230
615-391-2714

REPUTATION

WE DON'T JUST RIDE ON A GREAT REPUTATION

We go out and earn it everyday. That's why the name AiC has stood for excellence in DP consulting for over 24 years. Excellence in service, quality and results. It's a reputation you can be proud of.

Right now, we are seeking people with 2-plus years experience in any of the following:

IBM MAINFRAME, PC, AS/400
IDMS, DB2, ADABAS, ORACLE
COBOL, IBM ASSEMBLER, PL/1, RPG III
OS/MVS, VM/CMS, UNIX

DEC VAX, MICROVAX, VAX CLUSTERS
ORACLE, RDB, DATATRIEVE, ULTRA, MANTIS
VAX/VMS, DCL, ACMS, TDMS, CYBORG PAYROLL
COBOL, DIBOL, RPGII

As a member of our pacesetting organization, you'll enjoy an excellent salary, paid overtime, superior benefits . . . and the reputation of an industry leader. For more information, call **Paige Randolph at (404) 256-5190 or fax (404) 843-1693** or send your resume to Paige at: **Analysts International Corporation, Perimeter 400 Center, 1100 Johnson Ferry Road, Atlanta, Georgia 30342.** An Equal Opportunity Employer.

AiC

A Reputation You Can Be Proud Of

STATE OF IDAHO DEPT OF LAW ENFORCEMENT

Assistant Director
Information Systems Division

The Department of Law Enforcement has an immediate requirement for a hands-on Administrator with an extensive Public Safety and/or Law Enforcement background in a large mainframe DP operation. Our environment is a cluster of VAX VMS 6320's with WANS, LANS, on-line/real-time message switching, records management data bases and office automation applications serving a network of over 300 terminals and 150 plus PC's located in criminal justice agencies throughout the State of Idaho.

Responsibilities include overseeing the total needs assessment of the data center, long range planning, computer center design and construction as well as systems and network planning, design, development and procurement. Successful applicants must pass an extensive personal background check and polygraph examination.

Please forward your resume and salary history to the Idaho Dept of Law Enforcement, Dept JB, P.O. Box 55, Boise ID, 83707 to arrive not later than: 11/30/1990.

Equal Opportunity Employer

HOGAN

SPC is rapidly expanding our Atlanta office. We are looking for employees and contractors with experience in any of the following skills:

- **HOGAN LOANS**
- **ODS**
- **PAS**

SPC offers highly competitive salaries, company paid medical care, life insurance, disability, 401K pension plan, tuition reimbursement and relocation. For immediate consideration, call or forward your resume to: **Paul Hooper, SYSTEMS & PROGRAMMING CONSULTANTS, 3390 Peachtree Rd., NE, Ste. 1000, Atlanta, GA 30326, (404) 364-6505, FAX: (404) 364-6548.**

SPC
SYSTEMS & PROGRAMMING CONSULTANTS

HI-TECH OPPORTUNITIES

Top DP placement agency has 100's of MD, VA and DC wide openings for experienced DP professionals Our clients include small, mid-sized and large commercial firms They offer excellent benefits and advancement Some "hot" current openings include

PL1/CICS	To $45K	OASD PROD SPECIALISTS	To 54K
CDBOL/CICS	To $50K	CASE TOOL SPECIALISTS	To $60K
CDBOL/DB2	To $50K	SYSTEMS/DBA (DB2, IMS,	
IDMS/ADS/O	To $55K	Adabas, FOCUS)	To $60K

Call Pete Francisco
BILL YOUNG & ASSOCIATES
8550 Arlington Blvd. (Suite 202) • Fairfax, VA 22031
(703) 573-0200 (24 hr. answering) (703) 573-3612 (Fax/24 hr.)
MEMBER OF NATIONAL PERSONNEL ASSOCIATES

INFORMATION SYSTEMS PROFESSIONALS

CONSIDERING RELOCATING?
UNFAMILIAR WITH THE AREA?

PTS can help you make connections with some of the best Search and Recruiting Firms throughout the United States and alert you to some of the major companies in the area of your choice that match your qualifications and skill sets Through our **National Network,** we will put you in front of the people who can help you make the ***Right Move!***

TECHNICAL THROUGH MANAGEMENT
CALL: (206) 254-5315

OTC
Parallel Technology Solutions, Inc.
11818 S.E. Mill Plain Blvd.
Suite #307
Vancouver, WA 98684
PARALLEL TECHNOLOGY SOLUTIONS INC

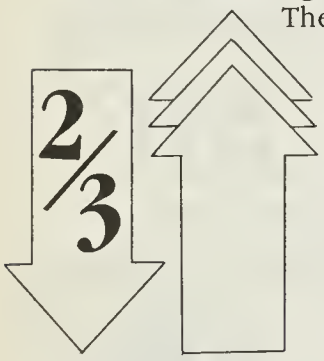
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely *is* competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better -and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

For every 10 of today's computer job seekers . . .
2 are Active ■ ■
7 are Passive ■ ■ ■ ■ ■ ■ ■
1 is a Non-mover ■

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

More job seekers see your ad in Computerworld than in any other newspaper — Sunday, daily, or trade

That's because *Computerworld* reaches over 612,000 qualified computer professionals every week — the largest audience of its kind, and one that's rich with passive and active job seekers.

That's why more companies advertise more jobs in *Computerworld* than in any other professional newspaper. And why *Computerworld* is the *single place* where America's computer professionals *expect* to see the most jobs every week.

Computerworld gives you regional editions

A key option when you need a regional candidate and want to avoid national response and relocation. Yet if your search is national in scope, *Computerworld* can also give you more widespread national exposure than any other source.

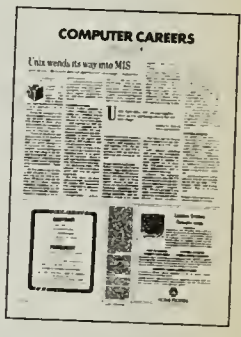
Computerworld needs just 3 working days for your ad to appear

That's comparable to most local newspapers. And why your ad can quickly appear in the next issue to start generating quality response.

Computerworld costs no more than local papers

And with a regional line rate of just $10.80, your cost-per qualified candidate reached is better than *any* newspaper - Sunday, daily or trade. Or just about any other source, for that matter.

Computerworld leads candidates to your ad



Just look at this week's Computer Careers section. You'll find a career editorial topic that will stir the interest of virtually any computer job seeker — passive *or* active. It's just one of countless reasons *Computerworld* is America's newspaper of choice on computing. No matter how much the times change.

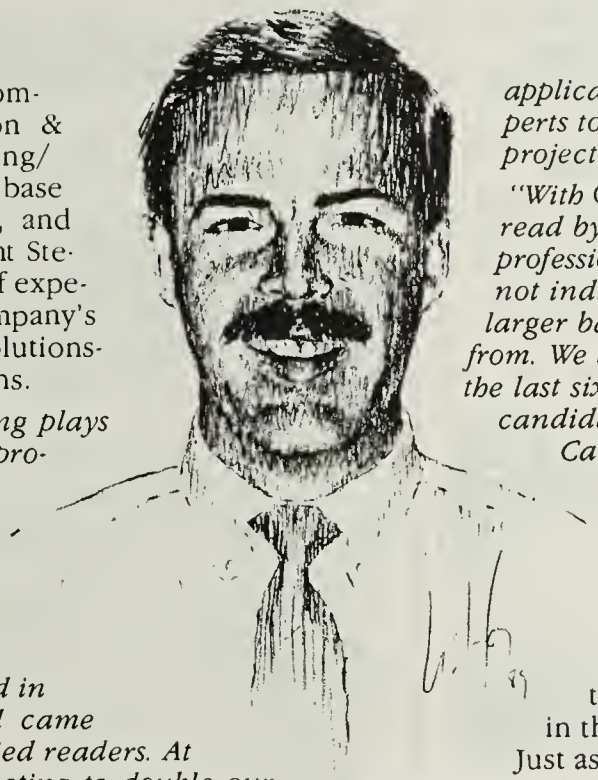
And while times may change, some things won't. Whether you *use* computers, *make* computers, or sell products and services *for* computers, *Computerworld* is still your major source of news today. And your major source of computer professionals tomorrow.

For more recruiting tips, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

Weekly. Regional. National. And it works.

"We'll be running a regular recruitment advertising schedule in Computerworld to get the results we need."

— Steven Tully
President
Brannon & Tully, Inc.



A custom software development company in Norcross, GA, Brannon & Tully, Inc. provides contract programing/consulting services to a diverse client base of Fortune 500 companies, utilities, and communications companies. President Steven Tully knows that building a staff of experienced professionals is key to the company's ongoing success in developing solutions-based software for specific applications.

"Because our recruitment advertising plays a vital role in finding the seasoned professionals Brannon & Tully needs, we have to expect one thing. Results. That's why Computerworld *is the only trade publication we use for recruitment advertising.*

"Of the over 50 professionals we hired in the past 18 months, over one-third came from Computerworld's *pool of qualified readers. At our present growth rate, we're expecting to double our size in the next 18 months. That means we'll be looking to augment our staff with more and more industry, applications, software, and programming experts to meet the growing demand for greater project diversification.*

"With Computerworld, *we know our ads get read by a very large audience of seasoned IS professionals. Because these professionals are not industry or hardware specific, we get a larger base of qualified professionals to choose from. We also get national reach. In fact, within the last six months alone, we recruited two candidates who moved all the way from California to the Atlanta area.*

"In other words, recruitment advertising in Computerworld *draws bigger numbers.*

Computerworld. We're helping serious employers and qualified information systems, communications, and PC professionals get together in the computer community. Every week. Just ask Steven Tully. For all the facts on how *Computerworld* can put you in touch with qualified personnel, call your local *Computerworld* Recruitment Advertising Representative today.

COMPUTERWORLD

The weekly newspaper of record for computer professionals.

Boston: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700
New York: Mack Center 1, 365 West Passaic Street, Rochelle Park, NJ 07662 (201) 587-0090
Washington, D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115
Chicago: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (708) 827-4433
Los Angeles: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 250-0164
San Francisco: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 250-0164

An IDG Communications Newspaper

Be A Part Of The Information Engineering Elite.

Eagles International's Advanced Technology Group is a recognized world leader in Information Engineering.

Phenomenal growth has created opportunities for highly qualified:

Information Engineers	Expert Systems
IEF/IEW	A/I
AS 400/SYNON Designers	DB2 DBA's
DB2 Developers	ADA P/A P/L
AS, DS2 NDMAD	INFDRMIX
UNIX, C, Xwindows, MOTIF	ORACLE

Write, phone, or fax Mr David R. Cutler or Mr. David H. Schwartz

Eagles International, where the rewards for performance are substantial.

EAGLES

EAGLES INTERNATIDNAL
15851 Dallas Parkway, Ste. 675 Dallas, TX
75248Phone:(214) 450-5900 Fax.(214) 450-5886

VMS/VAX SYSTEMS ENGINEER required. Systams Engineer working in DEC VAX environment using VMS, VAX Assembler, "C", and C++ in support of VAX Physical Invantory System. Enhance and maintain softwara applications in tha relational databasa araa as wall as databasa tuning and creation of data simulation systams for database tasting and problam idantification. Maintain applications dasigned for Database Managemant Systam (DBMS) using knowledge of Relational Databases and Assembler coding. Provides technical expertise in system support of tha VAX communications network. Applicant must possess a Mastars Degree or its equivalant in Computers, Math or Engineering plus ona year VMS/VAX, "C", and Assambler Programming in support of DBMS experience. Tha one yaar of axperiance must includa at least ona year of C++ and VAX databasa dasign including VAX databasa model simulation. Annual salary will be $36,000.00 per yaar for a 40 hour work week. Additional salary up to $44,000.00 per year may be paid if education and experience warrant. Interasted applicants contact the Oklahoma Employment Security Commission, ID #7202, 3105 E. Skally Drive, Tulsa, Oklahoma 74105-7202. Phone: (918) 749-6861. Refer to job ordar number 091278. Ad paid by an Equal Employment Opportunity Employer.

DATA PROCESSING POSITIONS

SYSTEMS SPECIALIST —analyze the data processing requirements for new systems. Also design maintain and program mainframe/micro computer systems. Requires BA in Computer Sci or related, and 2 years of professional data processing systems analysis with one year of programming in large-scale computer applications. Salary range $29K to $36K

SYSTEMS PROGRAMMER —assist in the development and modification of the Milwaukee Public School's mainframe operating system. Install, analyze and evaluate software/hardware. Requires degree in Comp Sci and three years of systems programming experience. Salary Range $35K to $40K

AUTOMATION & MATERIALS MANAGEMENT MANAGER (City Inventory Manager) — implement, coordinate and manage a citywide computerized procurement and inventory control system. Supervise the material management for all City warehouses. Requires degree in Bus./Comp Sci. and 4 years of experience. Salary Range $31K to $43K

For applications and further information contact — Adrian I. Foster, City Staffing Division, Box CWSS, City Hal Rm. 706, 200 East Wells Street, Milwaukee, WI 53202-3554 or call 278-3371

An EEO/Affirmative Action Employer

City of Milwaukee

DP PROS NEEDED NOW

TANDEM
All levels of experience sought worldwide

DATABASE PROS
IMS, DB/2, IDMS, ORACLE, INGRES

MIDRANGE SKILLS
S/38, AS/400, RPG OR COBOL

Contact **Electronic Search, Inc.**
3601 Algonquin Road Ste.201
Rolling Meadows, IL 60008
(708) 506-0700
Fax# (708) 506-9999

UNISYS

PROGRAMMERS

COBOL/DMS	to $44K
MAPPER	to $42K
LINC II	to $45K
USAS	to $48K
DBA's	to $50K
MCP or EXEC	to $55K
TRAVELING P/A's	to $42K

Wa hava permanant positions available in tha West, NW, SE, NE, East & Midwest. FREE servica to candidates.

COMPUTER STAFFING
call 800/88UNISYS

Florida

DON'T DREAM THE LIFE, LIVE THE DREAM!!!

Florida, with gentle winds bending the palms and an average temperature of 72°, is one of the finest places to live and work

AMD Consulting Services is experiencing phenomenal growth. Our customers, Florida's premier information processing centers, have immediate needs for professionals with experience in any of the following:

- COBOL, PLI, ALC, RPG3, "C", CICS
- FOCUS, ORACLE, INFORMIX
- DB2/SQL, IDMS, M204, IMS
- TANDEM COBOL, TAL, PATHWAY
- DEC/VAX, UNIX, PICK
- PCS/ADS, MCCORMACK & DODGE

It's your move, make it the RIGHT ONE.

AMD CONSULTING SERVICES

One Harbour Place
Suite 885 C
Tampa, Florida 33602
(813) 229-9208

Software Design Engineer-Chicago, Design, code, test and implement CCITT signalling system No. 7 (SS No.7) message transfer part (MTP) level 3 software for class 5 digital telephone switching systems. Two yrs exp in UNIX operating system and C language. Baccalaureate/Sci or Elect Eng. 2 yrs exp 9-5PM 40 hrs. $42,000./yr. Resume NO CALLS to: Illinois Dept of Employment Security, 401 South State St., 3 South, Chicago, Illinois 60605. ATT: Connie Evans, Ref#V-IL-1742-E. An Employer Paid Ad.

SUNBELT & ATLANTA

$25,000 to $95,000
IDMS/ORACLE/DATACOM/IMS/DB2
VAX/MAPICS/FOCUS/SYS38/AS400
BAL/PLI/DP SALES/TANDEM

Need Programmers, Programmer/Analysts for Full-Time and Consulting Positions in IBM Shops. Relocation Expenses Paid. Send resume to:

Jim Heard, EDP Consultants, Inc.
3067 Bunker Hill Road, Suite 202
Marietta, Georgia 30062

FAX: 24-HOURS
404-973-4052 or
404-977-8223

PHONE:
404-971-7281

MARKET ANALYST required. Develop marketing proposals for ratrofitting alectrical distribution equipment consistent for use in Industrial Plants in Southeast Asia and India. Develop markating proposals for Power System supply, damand and powar factor control. Applicants required to have a Bachelor of Science Degree in Markating and at least two years experience in the job offered. An annual salary of $28,000.00 will be paid for a 40 hour work week. Interasted applicants contact the Oklahoma Employment Security Commission, 3105 E. Skelly Driva, Tulsa, Oklahoma 74105-7202. Phone: (918) 749-6861. Refer to job order number 091277. Ad paid by an Equal Employment Opportunity Employer.

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you large numbers of professionals who work in your industry.

When you're recruiting computer professionals, it's often important to find ones with experience working on systems specific to your industry. From manufacturing to banking, healthcare to insurance, Computerworld reaches the right people in every major industry.

Number of Computerworld Readers with Experience in Key Industries (Entire Career)

Job Industry	of Computerworld's Audience ...
Computer Vendor and Consulting	147,897
Computer Manufacturer	79,521
large-scale computers	37,110
medium-scale computers	45,938
small-scale computers	33,851
personal computers	47,758
technical workstations	24,889
Software Vendor	130,589
for large-scale systems	57,561
for medium-scale	74,967
for small-scale systems	61,274
for personal computers	76,787
for technical workstations	26,379
Non-CPU Computer Products Manufacturer	36,994
VAR/dealer/retailer	27,557
DP Service Bureau/contract DP Services	53,077
Consulting/planning	86,677
Manufacturer (not computers)	168,664
Insurance	52,910
Healthcare	64,729
Banking/financial Services	97,953
Government - federal/state/local	110,399
Business Service (except DP)	40,108
Communications Systems	28,913
Public Utilities	54,364
Transportation	26,031
Wholesale/retail Trade	111,095
Education	125,184

SOURCE: Skill Survey of **Computerworld's** Audience, May 1989.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD

Where the best hires look. Every week.

Programming
CONSULTANT/SYSTEMS ANALYST - With minimal supervision, provide systems analysis/consulting services in project design, development and implementation of communications, financial management information, and commercial systems. Analyze business deta and trensactions, financial dete, statistics and/or eccounting operetions to design efficient user-friendly applications. Design, enalyze, develop, test and implement data base systems end develop both hardware and software modifications. Duties entail work with IBM Meinframes, PL/1, ASSEMBLER, CICS, VSAM AND MVS/XA. Must heve Bachelor's in Computer Science or Engineering or Math. Experience required is two years in job offered or two years as e Systems Analyst. Additionaly, experience must involve use of IBM Mainframes, PL/1, ASSEMBLER, CICS, VSAM and MVS/XA. M-F; 40 hrs/week; 8:00-5:00; Salary $34,000/yeer; Dallas, Texas location. Must heve proof of legal euthority to work in U.S. Apply et the Texas Employment Commission, Dallas, Texas, or send resume to the Texes Employment Commission, TEC Building, Austin, Texes 78778, J.O. #5424583 Ad Paid by An Equal Employment Opportunity Employer.

DB2 AS/400 CASE

ESA is assisting high-growth corporetions and entrepreneurially-run companies with their systems re-engineering efforts. Needed immedietely are first-rate contract programmers and systems consultants:

- **AS/400 Developers**
- **DB2/CICS Appl.Pgmrs**
- **DB2 DBA's**
- **Bachman**
- **KnowledgeWare**
- **COBOL/CSP Pgmrs**

Salaries $72-120K DOE. For immediate and confidential consideration, phone/fax/write:

Mr. Wendell Maness, EVP
Enterprise Systems Assoc.
7041 Koll Center Pkwy.
Suite 260
Pleasanton, Ca 94566
Ph: (415) 846-4256
Fax: (415) 846-7925

esa Opportunities Nationwide!

Are You Scared of the Dark?

Stephen King-ish nightmares of a recession? Balderdash! Our clients have over 200 great career opportunities located throughout the United States We need **TECHNICAL PEOPLE, and small-team leaders** with the following qualifications

- TCC· Life 70, Lifecom CCA, CUPS or Pealm, Vantage -- P/A s, programmers, Analysts As little as one year Life 70, Lifecom, CCA Lightweights in heavy demand To 65K+ for top experience in TCC product0
- Assembler coding skills, 2-8 years. Insurance background helpful To 40K
- Insurance programmers, P/A s, and **Project** leaders To 55K
- Insurance Business System's Analysts -- non-management. To 55K
- IDMS, DB2 and some IMS DB analysts, programmers, P/A's To 65K for top experience
- AS 400, System 38, Jr programmers, programmers, P/A's

Opportunities in Carolinas, Virginia, Georgia, Florida, California, Texas, throughout Midwest, some Eastern The demand for **TECHNICAL NON-MANAGEMENT personnel is VERY HIGH** All candidates should be open on relocation, serious about moving, and have **"hands on" technicel experience**, end be willing to work "hands on We are a Technical Search firm, specializing in MIS and DP Companies assume our fee and expenses

Call John Heckers a 1-800-441-5388 or fax your resume to 1-800-443-5388

Consulting, Inc.

SYSTEM SOFTWARE DEVELOPERS

PRODUCT SUPPORT
IBM ASSEMBLY AND EITHER VM, MVS, IMS OR DB2 TRAVEL AND NON-TRAVEL JOBS

SOFTWARE DEVELOPERS
STRONG IBM ASSEMBLY SKILLS AT THE SUPERVISORY LEVEL DB2, IMS, VTAM, VM OR MVS INTERNALS A PLUS.

SALARIES TO $80,000+

MULTIPLE LOCATIONS

ROBERT SHIELDS & ASSOCIATES
P.O. Box 890723, Dept. S
Houston, TX 77289-0723
800/423-5383
FAX: 713/486-1496

Sunbelt Opportunities

ADABAS/NAT Prog/Anal's	30-37K
TANDEM Prog/Anal's	30-40K
DB2/SQL Prog/Anal's	30-40K
AS/400-S/38 Prog/Anal's	30-37K
Bank Prog/Anal's	30-36K
Insurance Prog/Anal's	30-35K
Manufacturing Prog/Anal's	32-36K
Retail Prog/Anal's	29-34K
MSA or M&O Prog/Anal's	33-40K
CICS Prog/Anal's	30-36K
IMS DB/DC Prog/Anal's	30-36K
ASSEMBLER Prog/Anal's	29-35K
MVS/COBOL Prog/Anal's	25-30K
VAX/COBOL Prog/Anal's	32-36K
HP 3000-COBOL Prog/Anal's	30-35K
DB2 or IMS DBA's	40-49K
EDP Auditors	33-46K

North Carolina's largest employment agency, in business since 1975, 300 affiliates. Opportunities in the Southeast and nationwide

Corporate Personnel Consultants
3705-320 Latrobe Drive, Box 221739
Charlotte, NC 28222 (704) 366-1800
Attn: Rick Young, C.P.C.

NORTHERN CALIFORNIA

Openings in Sacramento & the San Francisco bay area. Minimum 2 yrs experience.

IMS Systems Programmer
IMS/DB2 DBA
MVS/XA Systems Programmer
DASD Management
VM Systems Programmer
X-WINDOWS and UNIX/C
Data Base Internals

QUANTUM SEARCH
P.O. Box 189279
Sacramento, CA 95818
(916) 454-9880

AS/400 S/38 IMS/DB2/CICS

Senior Level
PROGRAMMER ANALYSTS
Needed for long term contract assignments in Utah and Nevada.

Please call or send resume:

Systems West Computer Resources, Inc.
P.O. Box 11717
Salt Lake City, UT 84147
1-800-728-6881
1-801-364-7900

Senior System Software Engineer, Entry Business Unit. By November 14th please send resume to: Employment Security Department, ES Division, Att: Job # 229923-H, Olympia, Weshington 98504. Job Description: Designs, implements and tests complex and high level systems end software for micro computers. Works with other engineers to design business applications software including desktop publishing software utilizing "C" and 86 Assembler Series lenguages. Designs graphical user interfaces for desktop publishing, including 3-D graphics code. Assumes major project responsibility including: 1) requirements end analysis of project specifications; 2) product design; end 3) implementetion schedules. Two Positions Available. Requirements: M.A. or M.S. in Electrical Engineering, Computer Science, Mathematics or Physics. Six months of work experience in computer design or programming utilizing e graphics-based windowing operating system, "C" and 86 Assembler series languages, designing graphical user interface for applications software including 3-D graphics, and device-independent graphics code. 20 course hours in grephics design. Must have proof of legal authority to work in the United States. Job location: Redmond, Washington. Salary: $37,500-39,000 per annum, depending on experience. 40 hours per week, flex time. EOE

COMPUTER APPLICATIONS ENGINEER: Diagnose client's needs for computer implementation of scientific instruments, based on specifications sent by facsimiie machines from Koree and design combination of hardware end software to Implement. Prepare appropriete operation manuals in both Korean and English. Receive problem claims from Korean customers in Korea by facsimile machines and resolve same and forward solutions or translate into English and find solution jointly with American supplier and send solution to Korea in Korean language. Troubleshoot. Check ell hardware and software before export. Requires Master's degree in Computer Science. Also requires six months experience in the job to be performed or six months experience as a College Research Assistant, Computer Science. Must be literate and fluent in English and Korean. Must also have at least a Bachelor's degree in Electrical or Electronics Engineering Hours: 8:30 e.m. - 5:30 p.m. 40 hours per week et $34,000.00 per year salary. Please send resume to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South Stete Street - 3 South, Chicago, Illinois 60605, Attention: MARY MILLEA, Reference #V-IL 1844-M. NO CALLS, AN EMPLOYER PAID AD.

MAINE - NH $25,000 - 50,000 Salary

ROMAC, the largest and oldest placement agency in this area, is seeking qualified data processing professionals with salary requirments in the $25,000-$50,000 range. Our clients pay our fees.

ROMAC®
Att: Dept. 2
P.O. Box 7040
Portland, ME 04112
(207) 773-4749
FAX (207) 773-2645

Data Processing Technology
Research & Development

A successful Richmond, Virginia based company experiencing rapid growth is seeking an experienced individual for its Technology Research and Development team. This position involves the research, analysis, and presentation of MIS Technologies.

The preferred candidate will have relevant experience in or a detailed understanding of all areas of data processing including operating systems, database design, data communications, development languages, and hardware. Excellent communications skills and a sense for business are required. A strong educational background; M.S. or Phd. is preferred.

If you have the background we're looking for, and have always wanted to work for a company that employs leading edge technology, forward your resume and salary requirements to: **CW-43250, Computerworld, Box 9171, Framingham, MA 01701-9171.**

$45,000 to $60,000 PROGRAMMER/ANALYSTS
CICS/DB2/IMS

Recent acquisitions have resulted in the immediate need for experienced Systems Analysts and Programmers for Louisville, KY, Cincinnati, OH, and the Indianapolis, IN areas

Experience in large IBM environments utilizing Database and/or Data Communication products is preferred We are developing large DB2 applications and seek individuals with a sincere desire to utilize current skills and realize their growth potential

For consideration, send resume or call

TCI
2020 Meidinger Tower, Louisville, KY 40202
(502) 589-3110 FAX (502) 589-3107

SAN FRANCISCO BAY AREA

Please make note . . . Our clients have new and exciting openings with the following skills:

• ORACLE	Applications Programmers, Designers, Data Base Development
• AS-400	Programmers, Analysts
• C/UNIX	Programmers, Systems Administrators Systems Prugrammers
• CICS/Banking	Systems Analysts, Programmers

THE SEARCH FIRM, INC.
595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105
(415) 777-3900 FAX 777-8632

PROGRAMMER ANALYST

Southern Beptist Hospital's Information Systems Department is seeking a Programmer Analyst with experience in COBOL, VM/DOS, CICS, and VSAM. This position is responsible for the analysis, design, coding, testing and documentation of epplication programs. The preferred candidate will heve at least 3 years experience and a Bachelors degree.

Excellent salary and benefits to include relocetion allowance, tuition reimbursement, day care, summer camp for kids, health club, credit union and much more. Send resume and salary history to:

Southern Baptist Hospital
Human Resources
2700 Napoleon Avenue
New Orleans, LA 70115

(504)897-5909 or
1-800-627-4724
Tues. & Wed., 10am-12noon

EOE/MFH

Hardcore Software People

We need analysts/programmers for IBM or DEC environments. According to Inc. Magazine WTW is #130 of America's fastest growing companies. Join our team and earn what you're worth. WTW is a national software consulting firm offering excellent salary and benefits and the opportunity to position yourself for success.

Call immediately or send resume:

1-800-833-2892

Attn: Tom Hesson
Wesson, Taylor, Wells
PO Box 72137
Atlanta, GA
30007-2137

WTW SOFTWARE CONSULTING SERVICES

OUR BUSINESS...

Our products are brilliant. They control temperature, security, lighting, hazard detection and more in the world's largest buildings and office complexes. They're fully automated, incredibly flexible. And they're backed by an outstanding technical team

Our products and our people make it smart business to do business with Johnson Controls. Today, we're doing business like never before.

...IS SMART BUSINESS

We're installing satellite networks that link the customer with service, distribution, manufacturing and technical consulting.

We're creating new decision support systems for business and technical applications that incorporate relational data analysis and link mainframes with AS/400, micros and PCs

We're investing in the people and technology to maximize our multiple-platform MIS resources including:

- 3090 with TSO, CICS, MVS/XA (VSAM/IDMS)
- AS/400 with Query/400 and Relational Database
- PCs using 4th generation, LOTUS, dBase and Novell/Ethernet

MAKE IT YOURS...

Openings include:

NETWORK ANALYST

Challenge involves establishment of LANs/WANs with emphasis on integration of applications across multiple platforms Background should include OS/2, MVS/XA, UNIX, Novell and experience with LAN technology related to engineering/manufacturing/distribution interfaces.

PROGRAMMER ANALYST

Involves developing and supporting financial and order processing applications across multiple platforms. Abilities must include IBM mainframe, MVS experience, with COBOL and CICS, as well as a strong analysis and design background

INFORMATION CENTER/ DECISION SUPPORT SPECIALIST

Key position will support end-users with training and support with new mainframe tools and LAN technology Background must include knowledge of FOCUS, RAMIS, NOMAD, SQL and current releases of LOTUS, WordPerfect, etc. Ability to develop/maintain dictionaries and user support tools essential.

...IN MILWAUKEE

There are few cities in the United States that compare to the exceptional quality of life you can find in Milwaukee. With a sparkling lake front and emphasis on family values, you will discover a city that is rich in alternatives for housing, education and entertainment

Johnson Controls, Inc is structured to bring ideas from mind to market. Find out more about the career opportunities we offer. Send a resume in strictest confidence to: Cynthia Reynolds, Reply # CW-77, Johnson Controls, Inc., 507 E. Michigan Street, P.O. Box 423, Milwaukee, WI 53201-0423. An EEO/Affirmative Action Employer — Women and Minorities are Strongly Encouraged to Apply

JOHNSON CONTROLS
CONTROLS GROUP

HENCO SOFTWARE

Henco Software is the industry leoder in the information integrotion morket providing tools which improve the decision-moking process used by professionols in mojor orgonizotions. Our flogship product, SYNCHRONY, which runs on Digitol VAX computers, simultoneously integrotes text and doto allowing users to work directly with dota, documents from multiple word processors, and opticolly sconned documents.

A Boston-bosed softwore development company, Henco's Product Development Center is located in **Carbondale, Colorado.**

Vice President Of Product Development

- Monoges Engineering and Documentotion
- Hires, trains ond continues to build o first-closs team devoted to quality
- Minimum of 15 yeors' experience with at leost 5 yeors in o major corporation in product development monagement position
- Proven trock record of successful product creation
- Knowledge of odvonced doto models, text retrievol, and imoging desirable
- BS in CS or reloted field required MS in CS desiroble

Cut Down On Application Time

If your resume is not up to date, please send or fax a brief history of your professional work experience to Rosemary Matton, Director of Human Resources, Henco Software, 100 Fifth Avenue, Waltham, MA 02154; fax to her attention at (617) 890-7671; or call Rosemary collect at (617) 890-8670. Principals only please.

An equal opportunity employer

Try using CD-ROM technology to eliminate costly paper trails

BY SIMSON L. GARFINKEL
SPECIAL TO CW

Need to send three binders of forms and procedures to a dozen offices and update them every month? Why not put the information on a CD-ROM?

CD-ROMs, short for compact disc/read-only memory, look just like the compact discs that have been sold in record stores for the past five years, except instead of holding digitized music, they store data — and lots of it. A single CD-ROM can hold more than 500M bytes of information.

To get that information off the disc, you need a special CD-ROM drive. These drives look like regular compact disc players, except instead of connecting to your amplifer, they connect over a small computer systems interface to your computer. Most CD-ROM drives cost anywhere from $300 wholesale to $900 retail.

Because the data on most CD-ROMs is arranged according to International Standards Organization standards, you can read most CD-ROMs on different kinds of computers, including IBM Personal Computers, Apple Computer, Inc. Macintoshes and a number of workstations.

For nearly three years, publishers have been using CD-ROMs to deliver 100M-byte databases to the desktop. For example, you can buy a CD-ROM set containing the name, address, ZIP code and telephone number of every person living in the U.S. from Phonedisc USA in Warwick, N.Y.

However, a less visible and potentially more widespread CD-ROM application is to distribute information internally, according to Jeff Casto, who manages retail products at Dublin, Ohio-based Discovery Systems, one of the largest CD-ROM manufacturers in the U.S.

The reason is cost: After spending between $1,000 and $2,000 to make a CD-ROM master, each disc can be pressed for about two dollars. If you are sending out 222,000 pages of text — about the amount a single CD-ROM can hold — the cost of the paper and postage alone far outweighs the cost of the CD-ROM, according to Knowledge Access International, a maker of CD-ROM indexing and retrieval software in Mountain View, Calif. Even if you are only sending out a 300-page binder, it's still cheaper to press and mail a CD-ROM.

Compared with floppy disks or magnetic tape, CD-ROMs offer the advantages of significantly lower failure rates as well as data permanence: The information on a CD-ROM can't be changed, accidentally or otherwise, and it is also safe from magnetic fields and coffee spills.

These days, it's quite easy for nearly anybody to make a CD-ROM. All you do is set up a hard disk with all of the files and directories that you want on the CD-ROM and copy them onto a backup tape. Next, send that tape to a CD-ROM mastering plant. At the plant, the data will be copied off your tape, processed and etched into a glass master. This master is then used to make the individual discs.

But setting up your hard disk — acquiring and arranging the data — can be a time-consuming task. First, you have to get the data on-line. If most of your documents are available only on paper, they will have to be retyped or scanned with an optical character reader.

Top 5 best-selling CD-ROM discs

1. **Microsoft's** Baakshelf
2. **Grolier Electronic Publishing's** Encyclapedia
3. **Microsoft's** Programmer's Library
4. **Bureau of Electronic Publishing's** Between Heaven and Hell II
5. **PC-SIG's** Library

Source: Bureau of Electronic Publishing — CW Chart: Doreen St. John

Next, you must figure out how to organize the data and decide how your users will read the information. For simple applications — having a CD-ROM filled with forms, for example — you may be satisfied just by putting the raw information onto the disc and letting your users copy it off. Most applications, however, will require suitable indexing and retrieval programs that cost $50 to $200 per copy.

Another advantage that companies find with CD-ROMs is their ability to update expeditiously. When a company sends out updated paper pages for a manual or a floppy disk with patches, installing the updates is often so difficult that users simply don't bother. The problem is most severe with technical documentation and procedures, says Richard Bowers, executive director of the Optical Publishing Association in Columbus, Ohio.

With a CD-ROM, instead of sending out updates, you send out new snapshots of the database, each one a complete copy containing every file. Users throw away their old CD-ROM and start using the new master CD-ROM.

Once your users get their CD-ROM drives, a whole world of information literally opens up. Many companies as well as the government are selling massive databases on CD-ROM, many for a few hundred dollars or less. And there are more than a dozen CD-ROMs containing public domain software, fonts, music and images for IBM PCs and Macintosh computers, most costing $50 or less.

For an idea of the information available, request a catalog from the Bureau of Electronic Publishing, P.O. Box 43131, Upper Montclair, N.J. 07043, or call (201) 746-3031. The Optical Publishing Association provides a list of firms and consultants who specialize in helping businesses develop internal CD-ROM applications. The Association can be reached at P.O. Box 21268, Columbus, Ohio, 43221 or by calling (614) 793-9660.

Garfinkel is a free-lance writer and computer consultant based in Cambridge, Mass.

Buy/Sell/Lease

COMPUTER ROOM EQUIPMENT

LIEBERT
Computer Room Air Conditioners
3 thru 22 Ton Units
Main Frame Chillers
3 thru 12 Ton Units
Power Distribution Units
30 thru 225 KVA

PILLER
40 & 75 KVA Silentblocks

LIEBERT, EXIDE, EMERSON EPE & IPM
18.75 - 556 KVA UPS Systems

RAISED ACCESS FLOORING
Thousands of square feet in stock, wood and steel.

All items listed are reconditioned with warranty

dp support
DP SUPPORT
P.O. Box 1409
Plano, TX 75086
214-422-4551
214/578-1236 Fax

IBM SPECIALISTS

SELL • LEASE • BUY
S/34 S/36 S/38 AS/400
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031

CMA COMPUTER MARKETING of America, Inc.
PO BOX 71 • 610 BRYAN ST. • OLD HICKORY, TN 37138

VAX RENTALS

MV 3600
MV 3800/3900
VAX 6000 SERIES
VAX 8000 SERIES
Systems & Peripherals

• Fast Turnaround • Dependable Products
• Upgrade/Add-On Flexibility
• 6 Months • 12 Months • 24 Months

BROOKVALE ASSOCIATES
EAST COAST (516) 273-7777
WEST COAST (206) 392-9878

COMPUTERWORLD
CLASSIFIED MARKETPLACE
Examines the issues while computer professionals examine your message. Call for all the details.
(800)343-6474
(In MA., 508/879-0700)

The BoCoEx index on used computers

Closing prices report for the week ending October 5, 1990

	Closing price	Recent high	Recent low
IBM PC Model 176	$250	$660	$200
XT Model 086	$500	$700	$350
XT Model 089	$550	$725	$400
AT Model 099	$900	$1,075	$850
AT Model 239	$975	$1,025	$700
AT Model 339	$1,025	$1,300	$900
PS/2 Model 30-286	$1,250	$1,300	$1,125
PS/2 Model 60	$1,500	$1,800	$1,400
PS/2 Model 70P	$3,375	$3,400	$3,175
Compaq Portable II	$975	$1,050	$875
Portable 286	$1,275	$1,450	$1,100
SLT-286	$2,500	$2,825	$1,700
Portable 386	$2,700	$3,000	$2,500
LTE 286	$2,100	$2,200	$2,000
Deskpro 286	$1,375	$1,400	$1,200
Deskpro 386/20	$2,900	$3,100	$2,400
Apple Macintosh 512	$375	$775	$275
512E	$450	$450	$350
Plus	$900	$1,075	$800
II	$3,150	$3,400	$3,050

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Buy/Sell/Lease

Buying Selling

DEC - SUN
Data General
Plus
All Peripherals

Call DCC
617-837-7255
or
301-750-7200

HONEYWELL

NEW/USED EQUIPMENT
- All Models
- Ultimate Equipment
- Older Equipment Available
- Buy-Sell-Lease-Trade

PARTS & REPAIR
FULLY GUARANTEED
PROMPT DELIVERY

Call: Level 6 Systems
1-216-951-2221

BULL

FOR SALE OR LEASE

- VAX 6210 System
- VAX 6310 Stand-Alone Available

Digital Computer Resale (713) 445-0082

612,000 MIS/DP Professionals see the

CLASSIFIED MARKETPLACE

each week.

Call for advertising information:

(800) 343-6474
(In MA., 508-879-0700)

COMPUTERWORLD

CLASSIFIED MARKETPLACE

Examines the issues while computer professionals examine your message. Call for all the details.

(800) 343-6474
(In MA., 508/879-0700)

IBM CPU & PERIPHERALS
Available For Immediate Possession
This Equipment Available At Current E.C. Levels

IBM 3090/150E

- 3725 MOD 2 (2)
- 3880 Cont. Unit
- 31XX Terminals
- 3174 Cont. Units
- 4245 Mod 20 Printer
- NCR 5365 Fiche Processor

Additional 3380 DASD (D,E,K), 3880 C.U.'s, Tape Drives (3480.3422) Laser Printer (3800/006) available under assignable leases.

For info. and feature lists call: 215-972-4070

HEWLETT PACKARD

1000 • 3000
9000

Computers
Peripherals
Terminals

Buy • Sell
Rent • Lease

EURODATA INC.
2574 Sheffield Road
Ottawa, Canada K1B 3V7
613-745-0921
FAX: 613-745-1172

IBM. BUY • SELL • LEASE

AS/400
S-3X
S-23
SERIES ONE
BANKING EQUIPMENT

AMCOM CORPORATION

800-328-7723
612-949-9400
FAX:
612-949-0750

New/Reconditioned
digital
Equipment

Whatever your requirements are for Digital Equipment, call CSI *first!* Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is ***eligible for DEC maintenance.***

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more

CSI Compurex Systems, Inc.
83 Eastman St.
Easton, MA 02334
Call Toll-Free
1-800-426-5499
In Mass. (508) 230-3700
FAX (508) 238-8250

Buy **RT RS/6000 SERIES/1 3X,AS/400 937X 4300** Sell
Lease Rent

Currently replacing Series/1's with the new RS/6000 line via EDX to AIX migration

612-942-9830

DATATREND Inc.
10250 Valley View Road
Suite 149
Eden Prairie, Minnesota 55344

Mini-Computers & T-Bar Switches For Sale

Bull DPS6's

Quantities and details supplied upon request.
No reasonable offer refused.

Fax #(714) 474-5793
Attn: Binnie Larson

Prime

Experienced
Systems
New & Used
Peripherals
Worldwide Service

Buy - Sell - Lease

OTW, Inc
305 Union St
Franklin MA 02038
508-520-0250

SPECTRA
EQUIPMENT CORPORATION

(714) 970-7000 (800) 745-1233 (714) 970-7095 FAX

BUY SELL RENT LEASE

IBM | digital

ANAHEIM CORPORATE CENTER
5101 E La Palma Ave
Suite 206
Anaheim
California 92807

LOS ANGELES
SAN JOSE
SEATTLE

IBM	digital	
9370, 4381	MicroVax	*PROCESSORS*
AS400, S/36,S/38	VAX 6000	*PERIPHERALS*
Point of Sale	VAX 8000	*UPGRADES*
CAD/CAM		
Series/1		
Banking		

Integrity . . . the Spectra difference!

A full line IBM and Digital computer dealer

IBM BUY · SELL · LEASE

Member Computer Dealers & Lessors Association CDLA

9370
4381
SYSTEM 36/38
AS/400
SERIES 1
POINT OF SALE

• Processors
• Peripherals
• Upgrades

DEMPSEY & ASSOCIATES

18377 Beach Blvd., Suite 323
Huntington Beach, CA 92648 (714) 847-8486

(800) 888-2000

HONEYWELL
LEVEL 6 DPS 6
SERIES 16

- Complete Minicomputer Line -- New & Used
- All Peripherals & Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guerenteed
- Immediate Delivery Low Prices
- HDS 5 and HDS 7 Compatible Terminals

The Recognized Leader in Honeywell Minicomputer Sales and Support

BCS

BOUDREAU COMPUTER SERVICES
100 Bearfoot Road
Northboro, MA 01532
(508) 393-8839
FAX 508-393-3781
"Since 1974"

CALL US LAST

GET YOUR BEST PRICE
THEN CALL
COMPUTER BROKERS, INC.
WE
Buy - Sell - Lease
New and Used IBM Equipment
AS400 - System 36, 38, 43XX

SHORT TERM RENTALS

Call 800-238-6405
IN TN 901-372-2622

ASCD MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

COMPUTER BROKERS, INC.
2978 Shelby St., Memphis, TN 38134
'Since 1974'

1-800-IBM®

The only number you need to know when buying, selling or leasing IBM® equipment.

IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES INC

NEWPORT LEASING, INC. • 2943 Pullman St. • Santa Ana, CA 92705-5818
OFFICE: 714/476-8476 FAX: 714/476-9200

COMPUTERWORLD
Classified Marketplace

delivers your message in companies that plan to buy your product or service.

From PCs to minis, mainframes to supercomputers, Computerworld's readers buy products across all ranges of today's computers. So if you're selling, advertise in the newspaper that delivers readers that plan to buy YOUR product or service. Advertise in Computerworld's Classified Marketplace!

For more information, call:

800/343-6474
(in MA, 508/879-0700)

IBM 4381-R14

Available
November 5, 1990

IBM 4381-R14
dual processor
32 meg memory
18 channels

Contact:
Foster & Gallagher, Inc.
T. Gibson
(800) 447-0878

CLASSIFIED MARKETPLACE

Where Computer Professionals Shop

(800) 343-6474
(in MA, 508/879-0700)

PRIME

EXPERIENCED SYSTEMS AND PERIPHERALS

BUY-SELL-LEASE BROKERAGE

NEW PLUG-COMPATIBLE DISK, TAPE, MEMORY

PLUS
THE FASTEST I/O AVAILABLE ANYWHERE

1ST SOLUTIONS, INC.
11460 N CAVE CREEK RD
PHOENIX, AZ 85020

ASK FOR DON SHIFRIS

602-997-0997
Fax: 602-997-1688

CDLA

ICE INTERNATIONAL COMPUTER EXCHANGE LTD.
1-800-ICE-BUYS

BUY • SELL • LEASE • NEW • USED
PERIPHERALS • SYSTEMS • UPGRADES

RECONDITIONED COMPUTER EQUIPMENT

digital | Data General | SUN | apollo | IBM PC/AT/PS2

VAX 3100...Mod 40 NEW.....$14,000	IBM Mem Upgrades NEW/Boxed...$400 & Up
VT 420...New ..$460. VT 320...New ...$410. VT 220.....$225.	INTEL.....82380-20 INTEL.....80486-25
APOLLO DN2500 NEW.....$7,500	KDJ11-BF..11/84 CPU MSV11-JE....2 MB - 11/84

Call today for quote -
1-800-ICE-BUYS

INTERNATIONAL COMPUTER EXCHANGE, LTD.
TEL.: (617) 585-8688 • FAX: (617) 585-9177
• 163 MAIN ST • KINGSTON, MA 02364 •

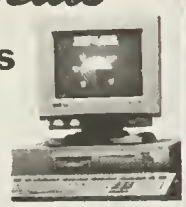
CALL 1-800 345-9370

9370
IN-HOUSE TECHNICIANS
Buy
Sell
Lease

SSI
simon systems Inc.

Buy/Sell/Lease

Great Deals on WANG PCs



- Custom configurations for LANetworking
- Most models in stock for immediate delivery
- Wang 300 and 400 series, workstations, printers, peripherals, Wang-compatibles
- Other PCs: IBM, Epson, HP, NEC, Arche, AST, Zenith, Toshiba, others . . .

SAVE 50% on WPB-Refurbished WANG VS, OIS, Printers, and Peripherals
Guaranteed acceptable for the WANG Service Contract

1-800-223-9264 wpb AUTHORIZED WANG PC DEALER

*New Wang PCs sold in Wang's Eastern Zone and Southern California only — 8 Sales Offices — Member WIDA

DATA CENTER IMMEDIATELY AVAILABLE

Prime Philadelphia location
6,500 sq. ft. computer room raised floor
12,000 sq. ft. office space

Facility includes:
- ✓ Security, Halon, Sprinkler, HVAC & Power cond.
- ✓ Discounted $1,000,000 of leasehold improvements
- ✓ 45 modular cubicles, 5 private offices, training room, documentation room, conference room
- ✓ Close proximity to two major hot-site vendors

Exceptional move-in condition. Center city location convenient to all modes of transportation.

For information call: 215-972-4070

Associates Inc

- Data General
- Fujitsu
- Data Products
- CDC
- Printronix
- Zetaco

BUY SELL TRADE

617/982-9664

FAX: 617/871-4456

DATA CENTER ENVIRONMENTALS

U.P.S. - EXIDE, EMERSON, E.P.E., IPM, DELTEC, PILLAR
A/C - LIEBERT, DATA AIRE, AIRFLOW
D/G SETS - CAT, ONAN, KOHLER
FLOORING - TATE, C-TEC, BESCO

Used/Refurbished · Warranties/Recertification

BUY / SELL / BROKER

Computer Site Technologies, Inc.

262 S. Military Trail • Deerfield Beach, FL 33442
1-800-226-0784

HP HP HP HP

NEW and USED
1000 • 3000 • 9000
Including Spectrum

BUY • SELL • TRADE • RENT • LEASE
Processors • Peripherals • Systems

All in Stock - Immediate Delivery
All warranted to qualify for manufacturer's maintenance

ConAm Corporation
It's Performance That Counts!
800/643-4954 213/829-2277
FAX 213/829-9607

9370's That's All We Do!

From 20's to 90's
Most Machines, Peripherals & Features
IN STOCK

Call us for a quote
708-831-1255
Executive Infosource
1530 Eastwood Ave., # 100
Highland Park, IL 60035

BUY • SELL • LEASE

AS/400 S/38, 36, 34 SERIES 1

- SYSTEMS
- PERIPHERALS
- UPGRADES

SOURCE DATA PRODUCTS

19762 MacArthur Blvd •120, Irvine, CA 92715

(714) 851-1970
(800) 333-2669

GTEX FINANCIAL GROUP Inc

IBM

BUY SELL LEASE

PS/2 OPERATING LEASES

3084 3090 PERIPHERALS

OEM/PCM LEASES

800-888-7568
FAX 214/783-1379

Member CDLA EST. 1978

PIZARRO COMPUTER MARKETING INC

Buying used IBM equipment:
- ▸ 3380 - Disk
- ▸ 3480 - Tape
- ▸ 3880-X23 - Cache Controllers (any model)
- ▸ 3990 - Controllers

*** Eligible for IBM M/A

Call Chris Bratun
(216) 892-3990
END-USERS ONLY

Time/Services

Quality Outsourcing

- ♦ IBM Mainframe/Peripherals
- ♦ Full Technical Support
- ♦ 24 hour Help Desk w/ 800#
- ♦ Database Specialists
- ♦ Consulting Services
- ♦ Network Specialists
- ♦ Capacity Planning
- ♦ Automated Operations

Resources Available Include:

MVS/XA, VM/XA, CMS, CICS, DB2/QMF, TSO/E, ISPF/PDF, SAS, Librarian, IBM IN, PANVALET, EASYTREIVE, Telenet/Tymnet, TOP SECRET

ITAC Call: (201) 216-3216
INFORMATION TECHNOLOGY ALLIANCE CORPORATION

ICOTECH

MVS/XA	VTAM	DB2
TSO/ISPF/SDSF	FILE-AID	SIMWARE
CICS	INTERTEST	ACF2
ADABAS	SAS	ADC2
LIBRARIAN	$AVRS	

- 24 hour availability
- International access
- Superior technical support staff
- Uninterrupted Power Supply
- Certified on-site vault
- Disaster recovery
- Impeccable service

Call Now · Solve Your Computing Worries
TODAY & TOMORROW!
(201) 685-3400

OUTSOURCING AND REMOTE COMPUTING

- IBM MVS/XA Environment
- DB2, IDMS/R, Model 204 and 4GLs
- Professional Support Staff
- Experienced Migration Management Team
- Simplified Pricing and Invoicing
- AS/400
- Full Supporting Services
  - Media Conversion
  - Laser & Impact Print Facility
  - Application Programming
- Technical Support
- 24 Hours a Day – 7 Days a Week

May & Speh, inc.
1501 Opus Place Downers Grove IL 60515-5713
1(800) 729-1501
For More Information Contact Tony Ranieri

HAVE YOUR
QUALITY CONTROL
MATERIAL
SOURCE INSPECTED

DONE BY PROFESSIONALS FROM I.P.C TO AQAP OR MIL STDS IN THE OTTAWA VALLEY CANADA

International Clients
Phone (613) 729-9031
For Rates

ON-LINE WITH COMPUSOURCE

- Multiple centers
- RACF, CICS, tMS
- Volume & term discounts
- Full technical support
- Disaster recovery services
- MVS/XA, VM, DOS
- SAS, DB2
- Worldwide access
- Laser printing

COMPUSOURCE
(919) 469-3325

Advertise Your Products In The *Classified Marketplace*

Featuring

- ☐ Hardware
- ☐ Software
- ☐ PC Products
- ☐ Conversions
- ☐ Time/Services
- ☐ Buy/Sell/Lease
- ☐ Communications
- ☐ Peripherals/Supplies
- ☐ Business Opportunities
- ☐ Bids/Proposals/Real Estate
- ☐ Graphics/Desktop Publishing

Reach over 612,000 information systems professionals by placing your company's message in

Classified Marketplace.

Name: _____
Title: _____
Company: _____
Address: _____
City: _____
State: _____ Zip: _____
Telephone: _____

Ad Size:

_____ columns wide x _____ inches deep.

☐ I am enclosing ad material with this form.

Return this form and advertising material to:

COMPUTERWORLD
Classified Marketplace
375 Cochituate Road, Box 9171
Framingham, MA 01701-9171

(800) 343-6474
(In MA., (508) 879-0700)

COMPUTERWORLD
Where all computer buyers and sellers go to market

Time/Services

COMPUTERWORLD

Classified Marketplace

showcases your ad by product category!

Whether it's used equipment, software, time, services or just about any other category of computer product or service, *Computerworld's* Classified Marketplace is organized to make your ad visible and to make buying your product easy.

Just look!

Computerworld's Classified Marketplace Product Categories

software
hardware
conversions
PC products
time/services
buy/sell/lease
communications
bids/proposals/ real estate
graphics/desktop publishing
peripherals/supplies
business opportunities

So if you're selling computer products or services, advertise in the newspaper that showcases YOUR product or service. Advertise in *Computerworld's* Classified Marketplace!

For more information, call

800/343-6474
(in MA, 508/879-0700)

SUNGARD
COMPUTER SERVICES

. OUTSOURCING EXPERTISE

. FIXED PRICE COMPUTING

. ECONOMICAL PRICES - SIGNIFICANTLY LESS THAN IN-HOUSE

.IBM 3090 COMPUTERS WITH MVS/ESA, AND VM TECHNOLOGY

. EXTENSIVE NATIONWIDE TELCOM NETWORK

. EXTENSIVE LIBRARY OF THIRD PARTY SOFTWARE

. PROFESSIONAL SERVICES FOR APPLICATION SUPPORT & DEVELOPMENT

FOR MORE INFORMATION CALL:
(800) 441-4203 (215) 387-3890
(212) 943-9540

SUNGARD COMPUTER SERVICES INC.
1285 DRUMMERS LANE
WAYNE, PA 19086

QUALITY COMPUTING SERVICES

PROCESSING & SYSTEMS OPERATIONS
OUTSOURCING
FACILITIES MANAGEMENT
REMOTE COMPUTING / TIMESHARE

SYSTEMS PLANNING & CONSULTING
STRATEGIC SYSTEMS PLANNING
NEEDS ANALYSIS / FEASIBILITY
QUALITY ASSURANCE PROGRAMS

PROJECT MANAGEMENT
PROJECT LEAD / CONSULTANT SUPPORT
SYSTEMS DEVELOPMENT
SYSTEM / DATA CONVERSIONS

For more information contact Susan Boush at: (206) 924-2527 or (800) 654-9347

Weyerhaeuser Information Systems

REMOTE COMPUTING OUTSOURCING

- MVS/XA
- CICS
- DB2
- VM/370
- TSO
- IMS/DBDC
- DOS/VSE
- CMS

OVER 150 SOFTWARE PRODUCTS
- DEVELOPMENT
- PRODUCTIVITY
- DEBUGGING
- PERFORMANCE

- TELENET
- SEARSNET
- TYMNET
- IBM INFORMATION NETWORK

EXTRAORDINARY CUSTOMER SERVICE
MIGRATION MANAGEMENT

GIS INFORMATION SYSTEMS, INC
815 Commerce Drive, Oak Brook, IL 60521

708-574-3636
New England 617-595-8000

MCN Computer Services

is your link to perfection.

State-of-the-art IBM compatibility:

MVS-ESA * VM/XA * TSO/E * ROSCOE * CICS * IMS * IDMS/R * DB2 * QMF * PROFS *

Programmer productivity aids:

FILE-AID * CICS PLAYBACK * dBUG-AID * ABEND-AID * CICS ABEND-AID *
(Preceeding products are registered trademarks of Compuware Corporation)

MCN Computer Services provides outsourcing solutions to major international clients. With one of the country's finest computer facilities, your data is secure, yet readily available. High-quality, cost-effective services include:

- Remote computing
- Computer outsourcing
- Facility management

MCN Computer Services, Inc.

For more information, call Lisa Walker at:
1-800-521-0444

5225 Auto Club Drive
Dearborn, Michigan 48126

Financial Technologies

Innovative, Responsive, Quality

a few words that describe the most complete computer processor

offering.....

IBM 3090, MVS/XA, MSA, DB2, VM/HPO, TSO, CICS/VSAM and a multitude of third party software

the complete source for ... outsourcing ...

1-800-443-8797

14300 Sullyfield Circle
Chantilly, Virginia 22021

COST-EFFECTIVE COMPUTING SERVICES for TODAY and.... TOMORROW

COMDISCO COMPUTING SERVICES CORP.

Provides you with:

REMOTE COMPUTING
COMPUTER OUTSOURCING
FACILITY MANAGEMENT

Featuring:

- IBM® CPUs and Peripherals
- Systems Software: MVS/XA, TSO/E, ISPF/PDF, CICS, VM/XA, VM/SP, HPO, CMS
- Application Software: Database Management Application Development 4/GLs Graphics Statistical Analysis
- Multiple Communications Methods
- Technical Support
- Automated Tape Handling
- ULTRA-Secure Data Center
- Advanced Laser Printing
- Pricing to fit your needs

Call: Robert Marino
201-896-3011

COMDISCO

COMDISCO COMPUTING SERVICES CORP.
430 Gotham Parkway, Carlstadt, NJ 07072

COMPUTERWORLD

Classified Marketplace

needs only 3 days notice to run your ad!

When you're selling, you want your advertising to hit the market quickly and frequently. You can't afford to wait for an issue that's coming out several weeks -- or months -- into the future. With Computerworld, there's no waiting for the next available issue because we've got one for you every week.

What's more, your ad can appear in the Monday issue of Computerworld if you order just 3 days prior to the issue. Advertise in the newspaper that won't keep you waiting. Advertise in Computerworld's Classified Marketplace!

For more information, call:

800/343-6474
(in MA, 508/879-0700)

COMPUTERWORLD
Where all computer buyers and sellers go to market.

REMOTE COMPUTING

- We locate COMPUTER TIMESHARING, including OUTSOURCING on ALL mainframes.
- Since 1968 we have found your LOWEST prices from over 800 nationwide data centers.
- NEVER a charge to the Buyer, because our fee is paid by the Seller.

CALL DON SEIDEN AT
COMPUTER RESERVES, INC.
(201) 882-9700

Go Shopping in... Computerworld's

CLASSIFIED MARKETPLACE

Call for all the details

(800) 343-6474
(In MA., (508) 879-0700)

REMOTE PROCESSING

PERSONALIZED SERVICE

- *Guaranteed Service Levels*
- *Fixed Pricing*
- *Peak Load Processing*
- *Disaster Recovery Services*
- *Satellite Communications*
- *Printing & Mail Services*
- *VM/XA, MVS/XA, DOS/VSE*

Agway Data Services Inc.
Call 1-800-ADS-7112
"Committed to Customer Satisfaction"

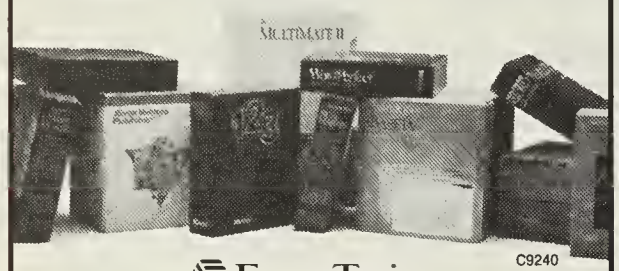
Business Opportunities

Executives: Lock Into A $44 Billion Program

ExecuTrain, the nation's leading personal computer training franchise, is now offering exclusive franchise opportunities in the $44 billion training industry. In just six years ExecuTrain has trained well over 100,000 business people how to use Lotus 1-2-3 and other popular micro-computer programs.

Operating in major cities from coast to coast, ExecuTrain employs state-of-the-art, results oriented, instructor led training methods.

To qualify for this "franchise of the future" opportunity, you must have a solid business background and at least $75,000 available to invest. For details call Tom Lang, Franchise Director, in Atlanta at 1-800-843-6984. ext 104.



C9240

ExecuTrain.
The Computer Training Leader

This is not an offering. An offering can only be made by a prospectus filed first with the State of New York. Such filing does not constitute approval.

Software packages pictured are registered trademarks of their respective manufacturers

Peripherals/Supplies

9-Track Tape For Your IBM PC/XT/AT/PS-2™

Read 1600 or 6250 bpi 9-track tapes from a micro, mini or mainframe in EBCDIC or ASCII as mirror image or by individual files.

Use the 2000 PC™ for disk backup, data interchange or archival storage.

PC/XT/AT/PS-2 are trademarks of IBM

First In Value

DIGI-DATA CORPORATION
8580 Dorsey Run Road
Jessup, MD 20794-9990
(800) 782-6395
FAX (301) 498-0771

COMPUTERWORLD

Classified Marketplace

gives you buyers with extensive purchase influence.

In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in Computerworld's Classified Marketplace!

For more information, call

(800) 343-6474

Software

KeyEntry III

PC-BASED DATA INPUT SOFTWARE

REPLACE DEDICATED DATA ENTRY SYSTEMS FRONT-END MAINFRAME APPLICATIONS

- LAN or stand-alone environments
- Two-pass verification
- Batch balancing and check digits
- Operator statistics reporting
- Embedded-numeric keypad emulation
- Extensive field edits and table lookups
- Screen Painter and MenuManager included
- Batch Control System and Reformat utility
- User-definable help screens and windows
- OS/2 version
- Outstanding customer support
- Thousands of users worldwide
- French, Spanish, and German versions
- Consulting, conversion and integration services

FREE evaluation systems available for qualified companies.

1-800-533-6879

SOUTHERN COMPUTER SYSTEMS, INC.
2732 Seventh Avenue South • Birmingham, Al 35233
PHONE (205)251-2985 • FAX (205)322-4851

FAX for UNIX

DON'T PAY MORE FOR LESS

386 and 486 UNIX
SCO XENIX • Sun
AIX • AT&T 3B

(609) 771-6705
Fax: 530-0898

Graphics/Desktop Publishing

PC SCREEN TO BIG SCREEN

Look to BOXLIGHT for the Largest Selection of LCD Pads

TRUE COLOR SYSTEMS from $4995
MONOCHROME SYSTEMS from $599

Solutions for VGA, EGA, CGA
All Macs, DEC VT 100s, 220s
IBM Terminals and More

BOXLIGHT™ CORPORATION

VISA, M/C, AMEX, COD 206/697-4008

Computer-Based Presentation Systems Since 1984

Conversions

CONVERSION EXPERTS

Family of integrated software tools that automate the following conversions:

- DOS to MVS
- DOS/MVS to AS400
- Honeywell to IBM
- CICS Macro to Command
- Any Cobol to Any Cobol
- Basic to Cobol

Products & services on your site or ours. Fixed fee or T&M.

Business Partner

NEOSYNETICS, INC.
2860 Des Plaines Ave., Suite 375
Des Plaines, Illinois 60018
708/299-0900 Fax: 299-6044

612,000 MIS/DP Professionals see the

CLASSIFIED MARKETPLACE

each week.

Call for advertising information:

(800) 343-6474
(In MA., 508-879-0700)

COMPUTERWORLD

Classified Marketplace

gives you reach to over 612,000 potential buyers!

And this audience is even verified by the Audit Bureau of Circulations in the only independently audited pass-along survey of its kind. What's more *Computerworld's* Classified Marketplace penetrates buying companies in all major industries. That's because *Computerworld's* total audience blankets key vertical markets that are major users -- and major buyers -- of computer products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers over 612,000 potential buyers. Advertise in *Computerworld's* Classified Marketplace!

For more information, call:

(800) 343-6474
(in MA, 508/879-0700)

COMPUTERWORLD
Where all computer buyers and sellers go to market.

ANOTHER REASON WHY COMPUTERWORLD'S MARKETPLACE PAGES WORK ...

Computerworld's Classified Marketplace gives you major decision makers for all types of computer products or services. And for good reason. These buyers purchase many products and services for all ranges of their organization's computers.

Subscribers Involved in Purchasing Computer Equipment and Services in User Organizations

Products	64%
Services	57%
Software	68%
Net Involved	71%

For Computers Other Than PCs

Peripherals	63%
Services	63%
Software	72%
Supplies	54%
Net Involved	76%

To place your ad, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
Where all computer buyers and sellers go to market.

The power of politics

Enhancing political skills can be a boon to IS managers

BY AVERY CLOUD
SPECIAL TO CW

Is politics a dirty word in your information systems department? It shouldn't be, and here's why.

Politics is the science of self-interest. It is the art of using influence, authority and power to achieve goals. Contrary to what most people think, however, politics is not inherently evil. Political skills, like technical skills, are just a tool for getting things done.

The problem is that political dexterity is not intuitively acquired. Even the brightest, most technically competent professional will have only limited success if he lacks political sophistication. An IS manager, along with everyone else in a company, must develop an understanding of the following concepts before he can wield a political sword:

Influence. Not everyone carries a lot of weight in a company. Respect is earned through social and professional networking, caucusing and so on. Influence can help managers gather voluntary support from the right people, or the right number of people, at the right time.

Authority. This is a valuable tool for any kind of manager because it places the weight of the organization behind his decisions. It is an official sanction that grants control of specific activities.

Power. This is a combination of the authority that is given to a person by the organization and the authority that followers give him by willingly submitting to his leadership.

A good grasp of these concepts can be used to your advantage.

Foul play

The next thing to be prepared for is dirty politics: unethical, illegal or immoral means used to satisfy some self-interest. Dirty politics can also mean the pursuit of some self-interest that is in conflict with the best interests of the company.

IS managers often see what they think is the best way to handle a project get swept under the rug. Why? Because of dirty politics. The solution that the manager thinks is the right one is often forfeited on behalf of some other political self-interest. Without a good understanding of what these self-interests are and how to get around them, IS managers might see outstanding projects crash and burn.

The self-interest stumbling blocks take several forms and all hold their own distinctions:

- **Departmental self-interest.** This might be seen in the department manager who is trying to make his department outshine others. This manager will favor decisions and projects that benefit his competitive agenda.
- **Personal self-interest.** A programmer who is trying to earn a promotion may show more affinity to decisions that will make him more promotable.
- **Corporate self-interest.** The senior executive interested in improving quarterly earnings might wear blinders to achieve this goal, ignoring anything that stands in the way.
- **Group self-interest.** Analysts, for example, might band together on decisions that would affect their position.

Every decision has some effect on, or is in conflict with, at least one of these self-interests. But if an IS professional is armed with influence, authority and power, along with an awareness of the self-interest stumbling blocks, he can take his quest two steps further.

Books for corporate political awareness

Organizations: A Micro, Macro Approach, by Richard L Daft & Richard M. Steers; Publisher – Scott, Foresman & Co.

A Book of 5 Rings: The Classic Guide to Strategies, by Victor Harris; Publisher – Overlook Press

The Art of War, by James Clavell; Publisher – Delacourt Press

Swim With The Sharks Without Being Eaten Alive, by Harvey Mackay; Publisher – Morrow

In Search of Excellence: Lessons From America's Best Run Companies, by Thomas J. Peters and Robert H. Waterman Jr.; Publisher – Harper and Row

CW Chart: Paul Mock

First, he can present each project to the self-interest group in the most nonthreatening manner possible. For example, he can focus everyone's attention on what they will get out of the deal. This way, he will be giving others a stake in the claim. Also, it can't hurt to vigorously market ideas, make decisions by consensus and keep affected parties up to date.

Second, where threat cannot be reduced, the IS manager can lobby for higher support until his decision is pushed through. He can appeal to the power brokers in the institution and use the principle of stakeholdership to gather enough power to overcome resistance.

Political training

An IS manager can play a big part in helping his staff become more politically aware, too. For example, a manager can invite employees to give input regarding decisions that will have a political impact. Managers should frequently and openly discuss the political ramifications of all projects and decisions confronting the department. A manager can use this to illustrate political realities and explain the many nuances of good political planning. Managers can also hold informal classes for their employees on the politics of their organization.

There are many good books, tapes and videos on the market that teach political awareness (see chart). A manager should make these a required part of each employee's annual training activities. He should also include a category in performance reviews that analyzes how well each employee has performed in terms of politics. With this kind of attention paid to political issues, the employee will be encouraged to take it more seriously. Formal education is also available.

While technical skills provide the vehicle for success, political skills grease the wheels. An IS manager should make sure that he and his staff are prepared for all of the twists and turns — and aren't left eating someone else's political dust.

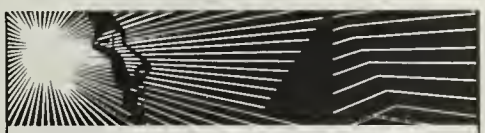
Cloud is manager of technical services in the information services department at Bowman Gray/Baptist Hospital in Winston-Salem, N.C.

Tips & Techniques Developers Handbook
NATURAL 2
NATURAL 2 Study Guide
Inside ADABAS Study Guide
Introduction to PREDICT
Introduction to SUPER NATURAL
XWords™ Cross Referencing Pkg
W H & O International
P O Box 82-335 Tel: (617) 239-0822
Wellesley, MA 02181 FAX: (617) 239-0827

Educate your customers with
Computerworld's
TRAINING
Section.

Instructor-Led Mainframe Training and Development for IBM and related products.
interact
INFORMATION SERVICES, INC
914-332-6100
(Within NYS)
800-628-5471
(Outside NYS)

COMPUTERWORLD
TRAINING SECTION
Examines the issues while Computer Professionals examine your message. Call for all the details
(800) 343-6474
(in MA., 508/879-0700)


PROMOTING A BETTER UNDERSTANDING OF
INFORMATION ENGINEERING
CEC is pleased to present the current public offerings of our Information Engineering courses.

Course	Date	Location	Price/ Student
IE/Planning	Nov. 5-7	Los Angeles	$895.00
IE/Analysis	Nov. 12-14	Los Angeles	$895.00
IE/Design	Oct. 22-25	Detroit	$1195.00
	Dec. 3-6	Los Angeles	$1195.00

For more information about our offerings, please contact the CEC Education Coordinator at:
(313) 569-0900
cec
"The IE Practitioners"
18620 W. 10 Mile Rd. • Southfield, MI 48075-2667

Does your information runneth over?

ISIM provides a convenient educational alternative to costly hardware & software solutions for information managment.
Call (800) 441-4746 for a free catalog of online courses.
ISIM
International School of Information Management
P.O. Box 1999, Santa Barbara, CA 93116-1999

SALES OFFICES
Publisher/Fritz Landmann

Senior Vice-President/National Sales Director/Kevin Harold, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 **(508) 879-0700**

BOSTON: Regional Vice-President - North/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Bonaccorso, Linda Clinton, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 **(508) 879-0700**

CHICAGO: Regional Vice-President - Midwest/Kevin McPherson, Senior District Manager/Larry Craven, Sales Assistants/Kathy Sullivant, Karol Lange, **COMPUTERWORLD**, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (708) 827-4433

NEW YORK: Regional Vice-President - East/Bernie Hockswender, District Managers/Fred LoSapio, Paula D'Amico, Sales Assistants/Susan Kusnic, Patricia DeBiase, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

LOS ANGELES: Regional Vice-President - West/Michela O'Connor Abrams, Southwestern Regional Manager/Carolyn Knox. Sales Assistant/Bev Raus, **COMPUTERWORLD**, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Regional Vice-President - West/Michela O'Connor Abrams, Senior District Manager/Ernie Chamberlain, District Managers/Alicia Sanballs, Michele Gerus, John J. Flood, Sales Assistants/Nunt Zekman, Chris Kobayashi, Carol Lacasse, Lisa Cremarosa **COMPUTERWORLD**, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Regional Vice-President - East/Bernie Hockswender, District Manager/Melissa Christie Neighbors, Sales Assistant/Debra Brown, **COMPUTERWORLD**, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Regional Vice-President - Midwest/Kevin McPherson, Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, **COMPUTERWORLD**, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Regional Vice-President - East/Bernie Hockswender, District Manager/Paula D'Amico, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350

CLASSIFIED ADVERTISING SALES:
Vice President/Classified Advertising/John Corrigan, Marketing Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA **(508) 879-0700**

PRODUCT CLASSIFIED ADVERTISING:
East: Account Manager/Paul Bonamgo, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA **(508) 879-0700**

West: Account Executive/Bill Creonte, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA **(508) 879-0700**

RECRUITMENT ADVERTISING SALES OFFICES:
New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700, Account Executive/Andrew Rowe, (800) 343-6474, In MA **(508) 879-0700**

Mid-Atlantic: Regional Manager/Valerie Galbo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350, Account Executive/Caryn Glott, (800) 343-6474

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, O'Hare Corp. Twr 1, 10400 W. Higgins Rd., Ste. 300, Rosemont, IL 60018 (708) 827-4433, Account Executive/Ellen Casey (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:
East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Executive/Jill Halbert, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 **(508) 879-0700**

West Coast Marketing Manager/Leslie Bamer, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.
An IDG Company: The Worlds Leader in Information Services on Information Technology.

Fritz Landmann
President & Publisher

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 508-879-0700, Telex: 95-1153, FAX: 508-872-8564

Val Landi	Kevin Harold	Matthew Smith
Senior Vice-President	**Senior Vice-President**	**Senior Vice-President**
Special Publications Division	**National Sales Director**	**Chief Financial Officer**

FINANCE Controller, Mark Sullivan.
SALES Advertising Director, Carolyn Novack. Vice President Classified Advertising, John Corrigan. Marketing Director, Derek E. Hulitzky. Classified Operations Director, Cynthia Delany. Display Advertising Production Manager, Maureen Hanley. Classified Sales Supervisor, Jay Novack
MARKETING Vice President/Business Development, Jan Harper. Manager, Marketing Communications, Mary Doyle. Account Manager, Marketing Communications, Elizabeth Phillips. Manager, Trade Show & Conventions, Audrey Shohan.
CIRCULATION Director of Circulation Management, Maureen Burke. Director of Circulation Promotion, Carol Spach.
PRODUCTION Vice President/Manufacturing, Leigh Horneth. Director of Publishing Technology, Carol Polack. Production Manager, Beverly Wolff.
PUBLISHER'S OFFICE Assistant to the President, Karen Elliott. Assistant to the Senior Vice-President/National Sales Director, Nancy Gibbs. Assistant to the Senior Vice-President/Special Publication Division, Libby Levinson

GLOBAL LEADERSHIP NETWORK
FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argento, CW Communicaciones S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex (390) 22644 (BAZAN AR).

ASIA: S.W. Chan, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone. (011) 852 5 861 3238 FAX: (011) 852 5 86 10953.

AUSTRALIA: Alan Power, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 439 5133. Telex: (790) AA74752 (COMWOR). FAX: (011) 61 2 439 5512.

AUSTRIA: Manfred Weiss, CW Publikationen Verlags Ges.m.b.H., Zieglergasse 6, A-1070 Wien, Austria. Phone: (011) 43-523 16-31-0. Telex: (847) 115542 (SCH/A) FAX (011) 43 523 05 08 33.

BRAZIL: Ney Kruel, Computerworld do Brazil Ltda, Praca Floriano, 19/26 Andar, 2031 Rio de Janiero, RJ Brazil. Phone: (011) 55 21 240 8225. Telex (391) 21 30830 BR. Sao Paulo: Computerworld do Brazil Ltda., Rua Joaquim Floriano, 488/3 andar-CEP 04534, Sao Paulo, Brazil, Tel: (011) 55 11 853 8149. Telex: (391) 1132017 (WORO BR).

COLOMBIA: Rodrigo Ruentes, La Nueva Ley, Transv. 42B No. 99 A/66, Apartado 58505, Bogota, D.E. Columbia Tel: (011) 571 271 5165

DENMARK: Preben Engell, IDG Danmark A/S, Knyrntappen 4 DK-2500 Valby Denmark. Tel: (011) 45 36 442800. Telex: (855) 31566. FAX (011) 45 36 442033

FRANCE: Francois Chaussonniere, IDG Communications S.A., Immeuble La Fayette, 2, Place des Vosges, Cedex 65, 92051 Paris la Defense, France Tel: (011) 33 1 4904 7900. Telex: (842) 613234F. FAX: (011) 33 1 4904 7800.

HUNGARY: Oezso Futasz, Computerworld Informatika Co., Kft. Pf. 386, 1536 Budapest, Hungary. Phone: (011) 3611 228 458 Telex (861) 225307 (KSHP H). FAX (011) 3611 423 965.

INDIA: Michael Sales, Media Transasia India Ltd., 102 Anand Lok, New Delhi 110049, India Tel: (011) 91 11 644 0110 FAX: (011) 91 11 643 2950

ITALY: Umberto Costamagna, Computer Publishing Group CPG, Via Vida 7, 20127 Milano, Italy Phone: (011) 39-2. 2613432 Telex (843) 335318 FAX (011) 39 2 284 0737.

JAPAN: Jim Povec, IDG Communications/Japan, Kojicho TBR Bldg., 5-7 Kojimachi, Chiyodaku Tokyo 102, Japan. Tel (011) 81 3 222 5411. Telex (781) 252 4217. FAX (011) 81 3 222 6566.

MEXICO: Henry Morales, Computerworld Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Tel: (011) 52 5 514 4218 or 6309. Telex. (383) 177 1300 (ACHAME). FAX: (011) 525 511 4860

THE NETHERLANDS: Wout Berends, IDG Communications B.V., de Paulus Potterstraat 18, 1071 DA Amsterdam, The Netherlands Tel: (011) 31 20 664 6426/664 5818. Telex (844) 18242 (CWCOM NL). FAX, (011) 3120 796 006.

NEW ZEALAND: Martin Taylor, IDG Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland 1, New Zealand Phone (011) 64-9-779-902 Fax: (011) 64 9 774 604

NORWAY: Morten Hansen, CW Norge A/S, Hovinveien 43, 0576, Oslo 5, Norway. Phone. (011) 472 647725. Telex: (856) 76476 (CW NOR N). FAX (011) 47 268 0152

PEOPLE'S REPUBLIC OF CHINA: Shen Yao, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Tel: (011) 861 81 0044 Telex. (716) 222214 (CCW CN).

SINGAPORE: Asia Computerworld Communications, 04-07 Parkway Builders Centre, No.1 Marine Parade Central, Singapore 1544, Republic of China. Phone: (011) 65 345 8383 Telex. (786) RS 37003 (Comwor). FAX (011) 65 345 7097.

SOUTH KOREA: Young S. Gimm, Hi Tech Information, Inc. 3rd floor, Youngjae Building, 1600-7 Seocho 3 Dong, Seochogu, Seoul 137-073 Korea Tel: (011) 82 2 588 8922. FAX: (011) 82 2 582 9823.

SPAIN: Paco Zabala, CW Communications, S.A., Rafael Calvo, 18, 48, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex (831) 45522 (CW E). FAX (011) 34 1 419 6104.

SWEDEN: Bengt Mamfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Tel: (011) 46 8667 9180. Telex: (854) 14904 9 (NOVACW). FAX: (011) 46 8665 3132.

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex. (845) 816 710 (CWCI CH). FAX: (011) 41 1 55 1135.

TAIWAN, David Chu, IDG Communications/Taiwan, 4F-2, No. 137, Fu Hsin South Road, Sec. 1 Taipei, Taiwan, Phone: (011) 886 2 776 4553. Telex (785) 14142 (ACE-GROUP). FAX: (011) 886 2 721 6444

LONDON: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone. (011) 44 1 831 9252 Telex: (851) 262346. FAX. (011) 44 1 405 2347.

UNITED KINGDOM, Colin Smith, Olivar Smith & Partners, 18 Abbeville Mews, 88 Clapham Park Road, London SW4 7BX, United Kingdom. Phone: (011) 44-1-978-1440 FAX: (011) 44-1-978-1550.

VENEZUELA: Kalman von Vajna Nagy, IDG Comunicaciones C.A., Torre Maracaibo, Piso 10, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30. FAX. (011) 58 2 724970.

WEST GERMANY: Eckhard Utpadel, IDG Communications Verlag AG, Rheinstrasse 26/86, Postfach 40 04 29, 8000 Munich 40, West Germany. Phone. (011) 49 89 360860. Telex (851) 5215350. (COMW D). FAX. (011) 49 89 3 60 86257.

INTERNATIONAL DATA GROUP, INC.

Patrick J. McGovern	Axel Leblois	Walter Boyd	William P. Murphy
Board Chairman	**Vice-Chairman**	**President**	**Vice President/Finance**

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information. International Data Group publishes over 130 computer publications in more than 40 countries. Nineteen million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S *Computerworld Argentina*, ASIA'S *Asian Computerworld*, AUSTRALIA'S *Computerworld Australia, PC World, Macworld*; AUSTRIA'S *Computerwelt Oesterreich*; BRAZIL'S *DataNews, PC Mundo*; CANADA'S *ComputerData*; CHILE'S *Informatica, Computacion Personal*; COLUMBIA'S *Computerworld Columbia*, DENMARK'S *CAD/CAM WORLD, Computerworld Danmark, PC World, Macworld, Unix World*; FINLAND'S *Mikro PC, Tietovilkko*; FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Telecoms International*; HUNGARY'S *Computerworld SZT, Mikrovilag*; INDIA'S *Computers & Communications*; ISRAEL'S *People & Computers*; ITALY'S *Computerworld Italia, PC World Italia*; JAPAN'S *Computerworld Japan, Infoworld, Publish*; KOREA'S *Hi-Tech Information/Computerworld*, MEXICO'S *Computerworld Mexico, PC Journal*; THE NETHERLAND'S *Computerworld Netherlands, PC World, Amiga World*; NEW ZEALAND'S *Computerworld New Zealand, PC World New Zealand*; NIGERIA'S *PC World Africa*; NORWAY'S *Computerworld Norge, PC World Norge CAD/CAM, Macworld Norge*; PEOPLE'S REPUBLIC OF CHINA *China Computerworld, China Computerworld Monthly*; POLAND'S *Computers*; SPAIN'S *CIM World, Communicaciones World, Computerworld Espana, PC World, Amiga World*; SWEDEN'S *Computer Sweden, PC/Nyhetherna, Mikrodatorn, PC World, Macworld*; SWITZERLAND'S *Computerworld Schweiz*; TAIWAN'S *Computerworld Taiwan, PC World*; UNITED KINGDOM'S *Graduate Computerworld, PC Business World, ICL Today, Lotus UK, Macworld U.K.*; UNITED STATES' *Amiga World, CIO, Computerworld, Digital News, Federal Computer Week, GamePro, InCider, InfoWorld, International Custom Publishing, Macworld, Network World, PC Games, PC World, Portable Computing, PC Resource, Publish!, Run, Sun Tech Journal*; U.S.S.R.'S *PC World U.S.S.R., Manager, PC Express, Network*; VENEZUELA'S *Computerworld Venezuela, Micro Cmputerworld*, WEST GERMANY'S *Computerwoche, Information Management, PC Woche, PC Welt, Amiga Welt, Macwelt.*

ADVERTISERS INDEX

Apple Computer.....101-103
Ashton-Tate.....54-55
AT&T.....50-51, 82, 98-99
Avatar Corp.....112

B I Moyle Associates, Inc.....29

Chipcom.....12
Command Technology.....73
Communication Networks.....56
Computer Associates.....36-37, 80-81

Digital Equipment Corp.....20-21

Eastman Kodak.....100
Epson America.....85-88

Hewlett-Packard.....16-17, 40

IBM.....35, 105, 109, C3
Information Builders.....15
Inforum.....44
Interface Group.....84
Interface Systems.....89
Intergraph.....115

Knowledgeware.....92

Legent Corp.....23

Micro Focus.....41
Microcom.....49
Miller Freeman Expositions.....79
Mitron.....14
Multi Soft.....38
Must Software.....33

NCR Corp.....94-95
NEC.....46-47, 32
NETEC International.....48
Nynex.....74-75

Oracle Corp.....5, 9, 11

Pick Systems.....57-72
Progress Software.....76-77

Realia.....10
Ross Systems.....113

SAS Institute.....19, 90-91
Software 2000.....39
Software AG.....28
Software Engineering of America.....C4
Software Products International.....117
Spectragraphics.....118
Sterling Software.....106
Sun Microsystems.....42-43, 110-111
Sybase, Inc.....13
Syncsort.....3
Systems Center.....7
Systems Reliability.....18

Texas Instruments.....30-31

Unisys.....26-27
Universal Data Systems.....114

Wyse Technologies.....52-53

XDB Systems.....45

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

LEGAL NOTICE
U.S. POSTAL SERVICE
STATEMENT OF OWNERSHIP, MANAGEMENT and CIRCULATION
(Required by 39 U.S.C. 3685)

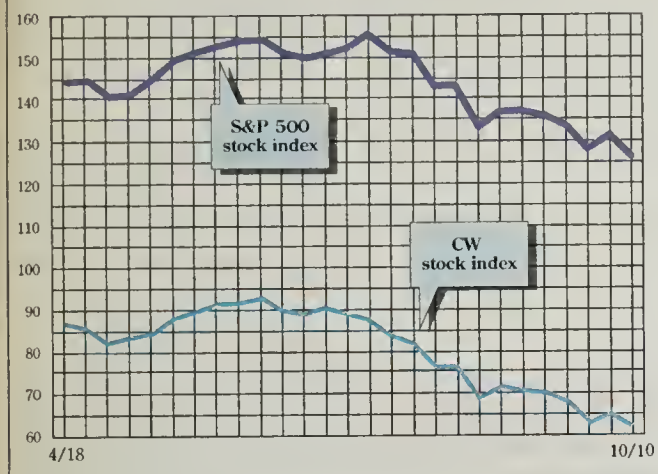
1. Title of Publication: *Computerworld*
1b. Publication No.: 00104841
2. Date of filing: October 15, 1990
3. Frequency of issue: weekly, with a single combined issue the last week in December and the first week in January.
3a. Number of issues published annually: 51
3b. Annual subscription price: $48.00
4. Location of known office of publication: 375 Cochituate Road, Framingham, MA 01701-9171 (Middlesex County).
5. Location of the headquarters of general business offices of the publishers: 375 Cochituate Road, Framingham, MA 01701-9171 (Middlesex County).
6. Names and addresses of the publisher, editor and executive editor: Publisher, Fritz Landmann, 375 Cochituate Road, Framingham, MA 01701-9171. Editor, Bill Laberis, 375 Cochituate Road, Framingham, MA 01701-9171. Executive Editor, Paul Gillin, 375 Cochituate Road, Framingham, MA 01701-9171.
7. Owner: International Data Group, Penthouse, 1 Exeter Plaza, Boston, MA 02116-2851.
8. Known bondholders, mortgages and other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities: International Data Group, Penthouse, 1 Exeter Plaza, Boston, MA 02116-2851.
9. For completion by nonprofit organizations authorized to mail at special rates: Not applicable.
10. Extent and nature of circulation:

	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
A. Total number of copies printed (net press run)	169,932	165,914
B. Paid and/or requested circulation		
1. Sales through dealers and carriers, street vendors and counter sales	None	None
2. Mail subscriptions (paid and/or requested)	153,474	149,974
C. Total paid and/or requested circulation	153,474	149,974
D. Free distribution by mail, carrier or other means, samples, complimentary and other free copies	14,021	13,055
E. Total distribution (Sum of C and D)	167,495	163,029
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing	2,437	2,885
2. Returns from news agents	None	None
G. Total (Sum of E, F1 and 2 — should equal net press run shown in A)	169,932	165,914

I certify that the statements made by me above are correct and complete.

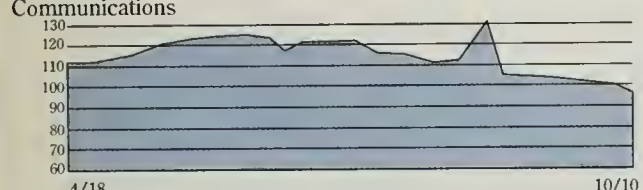
Pat Walker,
Traffic Manager

STOCK TRADING INDEX

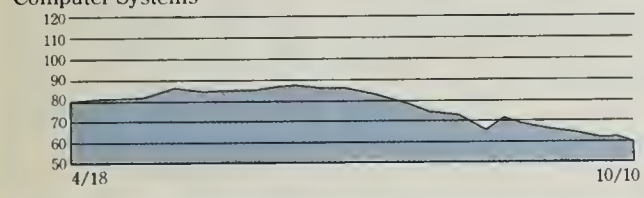


Indexes	Last Week	This Week
Communications	100.9	96.9
Computer Systems	62.2	60.1
Software & DP Services	90.9	86.3
Semiconductors	41.0	36.3
Peripherals & Subsystems	69.5	67.3
Leasing Companies	55.3	53.6
Composite Index	65.0	61.8
S&P 500 Index	131.6	126.9

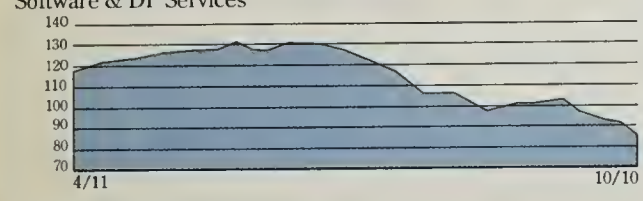
Communications



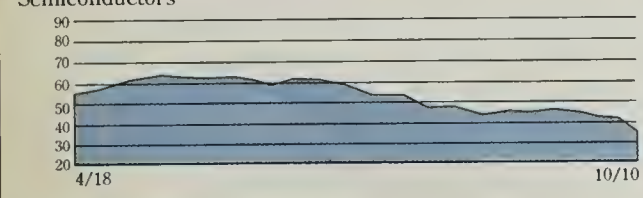
Computer Systems



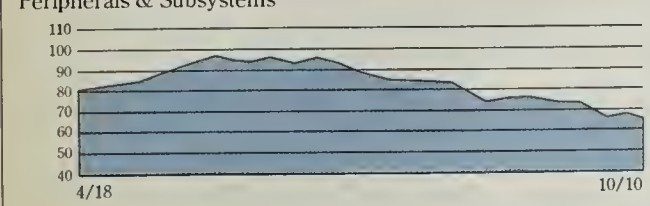
Software & DP Services



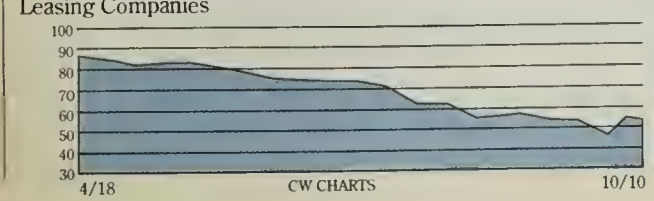
Semiconductors



Peripherals & Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESOAY, OCT. 10, 1990

EXCH		52-WEEK RANGE		PRICE CLOSE OCT. 10, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	68	53	61.875	-0.1	-0.2
Q	ANOREW CORP	26	16	16.5	-1.3	-7.0
Q	ARTEL COMM CORP	10	2	2.375	0.0	0.0
N	AT&T	47	30	31.125	-0.4	-1.2
Q	AVANTEK INC	6	2	1.75	-0.3	-12.5
N	AYOIN CORP	20	11	11.5	0.8	7.0
N	BELL ATLANTIC CORP	57	40	46.5	-1.5	-3.1
N	BELLSOUTH CORP	59	49	50.75	-1.5	-2.9
Q	COMPRESSION LABS INC	16	7	14.5	-0.9	-5.7
Q	CONTEL CORP	36	23	31.75	-1.0	-3.1
Q	OATA SWITCH CORP	4	2	2.875	-0.3	-8.0
Q	OIGITAL COMMASSOC	27	9	9.25	-5.8	-38.3
Q	OYNATECH CORP	20	13	12.625	0.1	1.0
Q	FIBRONICS INTNL INC	13	5	6	-0.5	-7.7
Q	GANOALF TECHNOLOGIES	6	2	2.375	0.4	18.8
N	GENERAL OATACOMM INOS	6	2	2.375	-0.1	-5.0
N	GTE CORP	36	24	26.375	-1.1	-4.1
Q	INFOTRON SYS CORP	10	2	2.25	0.3	12.5
N	ITT CORP	63	42	42.375	-4.3	-9.1
N	MA COM INC	7	3	4.25	-0.1	-2.9
Q	MCI COMMUNICATIONS CORP	48	30	32.5	-0.6	-1.9
N	NETWORK EQUIP TECH INC	34	5	6.S	-0.1	-1.9
Q	NFTWORK SYS CORP	15	7	8.625	-0.5	-5.S
N	NORTHERN TELECOM LTO	30	21	23.5	-0.6	-2.6
Q	NOVELL INC	29	12	21.S	-3.8	-14.9
N	NYNEX CORP	92	68	74.125	2.S	3.5
N	PACIFIC TELESIS GROUP	52	36	42.375	-0.S	-1.2
A	PENRIL CORP	9	S	4.875	-1.3	-20.4
N	SCIENTIFIC ATLANTA INC	29	13	12.75	-1.S	-10.5
N	SOUTHWESTERN BELL CORP	65	47	51.7S	-1.9	-3.5
Q	3 COM CORP	19	7	7.375	-0.4	-4.8
N	US WEST INC	41	32	35	-0.3	-0.7
Computer Systems						
Q	ALLIANT COMPUTER SYS	9	1	1.S	-0.5	-25.0
Q	ALPHA MICROSYSTEMS	7	1	1.375	0.0	0.0
A	AMOAHL CORP	19	10	11.125	0.0	0.0
Q	APPLE COMPUTER INC	SO	26	26.S	-0.5	-1.9
Q	AST RESH INC	26	8	17.25	-0.3	-1.4
N	BOLT BERANEK & NEWMAN	8	4	4.875	-0.1	-2.5
N	COMPAQ COMPUTER CORP	68	37	38.75	-2.9	-6.9
N	COMMOORE INTNL	12	S	6.25	0.9	16.3
Q	COMPUTER AUTOMATION INC	6	0	1	-0.2	-15.8
N	CONTROL OATA CORP	22	8	8.5	-0.8	-8.1
N	CRAY RESH INC	51	22	22	-5.S	-20.0
N	OATA GEN CORP	16	4	4.875	0.0	0.0
N	OATAPOINT CORP	6	1	1.125	0.2	19.9
Q	OELL COMPUTER CORP	14	5	8.625	-1.3	-12.7
N	OIGITAL EQUIP CORP	95	47	47	-5.5	-10.5
N	FLOATING POINT SYS INC	4	0	1.625	0.0	0.0
N	HARRIS CORP	40	17	17.25	-1.S	-8.0
N	HEWLETT PACKARD CO	52	28	28.25	-2.8	-8.9
N	HONEYWELL INC	112	73	74.875	-7.1	-8.7
N	IBM	123	93	103.S	-3.9	-3.6
Q	INFORMATION INTL INC	15	9	9.125	-0.1	-1.4
Q	IPL SYS INC	14	5	9	0.0	0.0
N	MAI BASIC FOUR INC	5	2	1.5	-0.3	-14.3
N	MATSUSHITA ELEC INOL LTO	172	116	138.125	0.6	0.5
Q	MENTOR GRAPHICS CORP	26	10	10	-0.5	-4.8
N	N8I INC	1	0	0.156	0.0	-17.0
N	NCR CORP	72	53	53.125	-5.4	-9.2
Q	PYRAMIO TECHNOLOGY	36	14	15.25	-1.4	-8.3
Q	SEQUENT COMPSYS INC	34	13	15.75	1.5	10.5
Q	SUN MICROSYSTEM INC	37	15	17.75	-1.8	-9.0
Q	SYMBOLICS INC	2	0	0.313	0.1	25.2
N	TANOEM COMPUTERS INC	30	10	9.625	-1.5	-13.5
N	TANDY CORP	47	24	25.375	0.3	1.0
N	ULTIMATE CORP	10	3	3.25	0.0	0.0
N	UNISYS CORP	20	3	4	0.0	0.0
A	WANG LABS INC	6	3	3.125	0.0	0.0
Software & DP Services						
Q	AMERICAN MGMT SYS INC	20	11	14	0.4	2.8
Q	AMERICAN SOFTWARE INC	18	8	7.625	-0.4	-4.7
N	ANACOMP INC	5	2	1.75	-0.1	-6.7
Q	ANALYSTS INTL CORP	24	10	10.5	0.0	0.0
Q	ASHTON TATE	15	5	6.375	1.1	21.4
Q	ASK COMPUTER SYS INC	10	4	4.625	-1.8	-27.5
N	AUTO OATA PROCESSING	60	44	47	-1.3	-2.6
Q	AUTODESK INC	60	32	32.5	-4.S	-12.2
Q	BMC SOFTWARE INC	30	16	19.25	-3.5	-15.4
N	BUSINESSLANO INC	12	2	1.875	-0.3	-11.8
Q	COGNOS INC	10	4	5.875	-0.9	-13.0
N	COMPUTER ASSOC INTL INC	17	4	5.25	0.4	7.7
Q	COMPUTER HORIZONS CORP	17	8	11	-0.3	-2.2
N	COMPUTER SCIENCES CORP	59	37	40.5	0.4	0.9
N	COMPUTER TASK GROUP INC	12	8	8.62S	-0.9	-9.2
Q	COMSHARE INC	25	14	16	-0.5	-3.0
Q	CORPORATE SOFTWARE	16	7	7.25	-1.8	-19.4
N	GENERAL MTRS (CLS E)	38	24	32.25	-1.5	-4.4
Q	GOAL SYSTEMS INTL	18	10	9.5	-0.8	-7.3
Q	HOGAN SYS INC	7	2	2.625	-0.1	-4.S
Q	INFORMIX CORP	18	S	4.5	-0.3	-5.3
Q	INTELLICORP INC	8	2	2.62S	-0.8	-22.2
Q	LEGENT CORP	31	17	17.25	-1.6	-8.6
Q	LOTUS OEV CORP	39	14	1S.75	-1.0	-6.0
Q	MICROSOFT CORP	81	35	59.5	-6.3	-9.5
Q	NATIONAL OATA CORP	35	8	9	-0.5	-5.3
N	ON LINE SOFTWARE INTL INC	11	5	5	-0.4	-7.0
Q	ORACLE SYS CORP	188	5	6	0.4	6.7
N	PANSOPHIC SYS INC	19	9	9	-1.3	-12.2
Q	PHOENIX TECHNOLOGIES INC	5	2	1.625	-0.5	-23.S
N	POLICY MGMT SYS CORP	43	30	35.5	-0.6	-1.7
Q	PROGRAMMING & SYS INC	25	12	13	-0.3	-1.9
Q	RELATIONAL TECH INC	10	3	8.5	-0.4	-4.2
N	REYNOLOS & REYNOLOS CO	27	13	13.875	-0.6	-4.3
Q	SAGE SOFTWARE INC	16	8	9.875	0.0	0.0
Q	SEI CORP	22	15	15	-0.5	-3.2
Q	SHARED MED SYS CORP	17	12	1S.75	0.0	0.0
Q	SOFTWARE PUBG CORP	28	14	1S.75	0.0	0.0
N	STERLING SOFTWARE INC	11	6	6	0.3	4.3
Q	SUNGARO OATA SYS INC	26	15	15	-1.5	-9.1
N	SYSTEM CENTER INC	25	6	8.5	-0.8	-8.1
N	SYS. SOFT INC	29	14	13.875	-1.9	-11.9
Q	WOROSTAR	2	1	1	0.2	23.0
Semiconductors						
N	AOV MICRO OEVICES INC	11	4	3.875	-1.1	-22.5
N	ANALOG OEVICES INC	10	6	6	-0.3	-4.0
Q	ANALOGIC CORP	11	8	8.25	-1.1	-12.0
Q	CHIPS & TECHNOLOGIES INC	26	7	7.25	-1.3	-14.7
Q	INTEL CORP	52	30	29.75	-3.5	-10.5
Q	MICRON TECHNOLOGY INC	16	7	7.5	-0.5	-6.3
N	MOTOROLA INC	88	52	53	-11.0	-17.2
N	NATL SEMICONOUCTOR	9	3	3.375	-0.5	-12.9
N	TEXAS INSTRS INC	44	24	24.25	-2.S	-9.3
A	WESTERN OIGITAL CORP	15	5	S.25	-1.0	-16.0
Peripherals						
Q	ALLOY COMP	2	0	0.5	0.0	6.6
N	AMINTL INC	6	1	1.375	0.0	0.0
Q	AUTO TROL TECH CORP	4	2	2.25	0.0	0.0
Q	BANCTEC INC	24	13	12.75	0.0	0.0
A	COGNITRONICS CORP	8	3	6	1.0	20.0
Q	CONNER PERIPHERALS	31	11	15.625	-1.4	-8.1
A	OATARAM CORP	22	8	9.5	-0.9	-8.4
N	EASTMAN KOOAK CO	48	35	35	-2.3	-6.0
N	E M C CORP MASS	7	3	5.625	-0.5	-8.2
Q	EMULEX CORP	9	4	5.625	-0.8	-11.8
Q	EVANS & SUTHERLANO	35	18	21	-0.5	-2.3
Q	ICOT CORP	2	0	0.563	0.0	0.0
Q	INTERLEAF INC	8	3	3	-0.4	-11.1
Q	IOMEGA CORP	6	3	4.375	-0.2	-4.1
Q	MASSTOR SYS CORP	3	1	0.688	0.1	22.2
Q	MAXTOR CORP	17	5	4.75	-1.0	-17.4
Q	MICROPOLIS CORP	10	3	6	0.8	14.3
N	MINNESOTA MNG & MFG CO	91	68	75.875	-2.4	-3.0
Q	PERSONAL COMP PROOUCTS INC	5	4	3.75	-0.1	-1.7
Q	PRINTRONIX INC	15	9	10	-0.3	-2.4
N	QMS INC	21	9	10.125	-1.5	-12.9
Q	QUANTUM CORP	26	9	14.25	-2.3	-13.6
N	RECOGNITION EQUIP INC	8	4	5	-0.1	-2.4
Q	REXON INC	10	4	4.625	-0.3	-5.1
Q	SEAGATE TECHNOLOGY	20	6	6.125	-0.5	-7.5
N	STORAGE TECH CORP	35	11	11.875	-0.9	-6.9
Q	TANDON CORP	4	1	1.625	-0.2	-10.4
N	TEKTRONIX INC	19	12	13.75	-1.1	-7.6
Q	TELEVIOEO SYS INC	1	0	0.219	0.0	-12.4
N	XEROX CORP	67	32	33.25	-1.6	-4.7
Leasing Companies						
N	CAPITAL ASSOC INTNL INC	7	1	1.063	0.0	0.0
N	COMOISCO INC	33	15	16.75	-0.1	-0.7
Q	LOI CORPORATION	18	11	10.75	-0.5	-4.4
Q	PHOENIX AMERN INC	5	3	4.813	0.3	7.0
Q	SELECTERM INC	8	3	3.25	-0.1	-1.9

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL

Castaways

Investors ran for the life boats as tech stocks hit rough seas

Grab those life preservers — technology stocks are sinking fast. In tandem with the big dive of the Dow Jones industrial average last week, tech stocks were also swamped with sellers, leaving many firms searching for a safe harbor.

The riptide pulled several bellwether companies under, including IBM, which lost 7¼ points last week to close Thursday at 101. Microsoft Corp. suffered a 6¾-point drop to 58, and Novell, Inc. skidded 5⅛ points to 18¾ by Thursday.

As in past weeks, the software sector showed more promise than other areas. Witness Ashton-Tate Corp. One of last week's few tech gainers, Ashton-Tate surged 1⅝ points to 7¼. Sterling Software, Inc. was also on the rise, edging up ⅜ of a notch to 6½ after strutting increased earnings for its fourth quarter.

Impending financials have some Wall Street watchers casting doubtful glances toward certain companies. Unisys Corp.'s third-quarter earnings projections were lowered recently by Prudential-Bache Securities, Inc., even though Prudential-Bache called the company a good long-term buy. However, Unisys shares advanced ⅜ of a point last week to 4.

Meanwhile, legal battles among semiconductor firms subsided but left stock prices lacking. Motorola, Inc. settled its disagreement with Hitachi Ltd. out of court and then released disappointing profit figures, yanking Motorola stock down 7⅛ points to 53⅜. No winner was declared in the argument between Advanced Micro Devices, Inc. (AMD) and Intel Corp. over rights to the 80386 chip; the case is still in arbitration. AMD lost ¾ of a point to 4¼, while Intel tumbled 3¾ points to 29⅛.

Among long-distance carriers, MCI Communications Corp. fell 1⅞ to 30⅜, AT&T was down by ⅜ of a point to 31⅜, and United Telecom, Inc. slipped 1⅛ points to 26⅞.

KIM S. NASH

NCR's spirit of Cooperation

BY ELLIS BOOKER
CW STAFF

NEW YORK — NCR Corp. last week took the wraps off Cooperation, a distributed, object-oriented software environment for enterprisewide computing.

The arrival of Cooperation is the second major announcement for NCR in the past month. In late September, it unveiled the first systems in a new hardware family to be built exclusively around the Intel Corp. microprocessor family [CW, Sept. 24].

The seven levels of the System 3000 computer family will range from laptops to massively parallel, loosely coupled behemoths composed of thousands of processors that, according to NCR, will be capable of up to 100,000 million instructions per second (MIPS).

The third and final leg in NCR's enterprisewide computer strategy will show its face tomorrow in Boston, when the company will describe a networking and network management scheme that uses the Open Systems Interconnect (OSI) model.

Taken together, the three announcements complete the Dayton, Ohio-based company's attempt to rapidly recast itself from a vendor of proprietary retail and financial systems into a standard bearer for open systems computing in the '90s, analysts said.

First in line

Cooperation is the first implementation of NCR's Open Cooperative Computing Architecture (OCCA), a client/server architecture it unveiled in February. According to NCR, Cooperation will run on Unix, DOS and OS/2 platforms at the client level and on OS/2 or Unix at the server level.

The software received universally high praise from analysts who had seen it.

"It hits all the right buttons," said Stuart Woodring, director of Software Strategy Research at Forrester Research, Inc. in Cambridge, Mass. "It's got open systems, a client/server architecture, object-oriented programming throughout . . . and it works."

However, while he praised Cooperation for its technical merits, Woodring questioned whether NCR, historically a hardware company, will be able to present itself as a credible vendor of software. By analogy, he noted the trouble Texas Instruments, Inc., a semiconductor company, has had in pushing its computer-aided software engineering tools.

Also at issue, according to Woodring, was the relatively hefty price of Cooperation — a couple of thousand dollars per user. "People will think twice or three times before buying an infrastructure product [at that price]," he said.

For the 24-user configuration of Cooperation, the price ranges from $40,000 to $58,000, or $1,700 to $2,500 per user, NCR said.

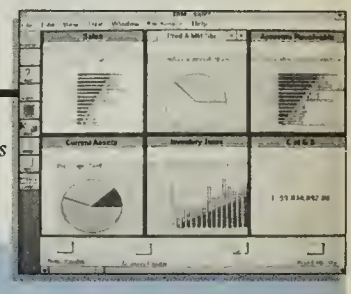
But Chuck Barney at Workgroup Technologies in Hampton, N.H., said Cooperation, with its promise to provide transparent access to information no matter where it resides in the organization, will have to be sold to "a different audience: decision-makers and executives, not the MIS department."

Barney added, "It strikes me that pricing is a secondary consideration if they can demonstrate [Cooperation's] problem-solving capabilities."

NCR hopes to use Cooperation as an entrance point into the executive suite, later using this to sell its high-performance System 3000 servers and workstations, Barney speculated.

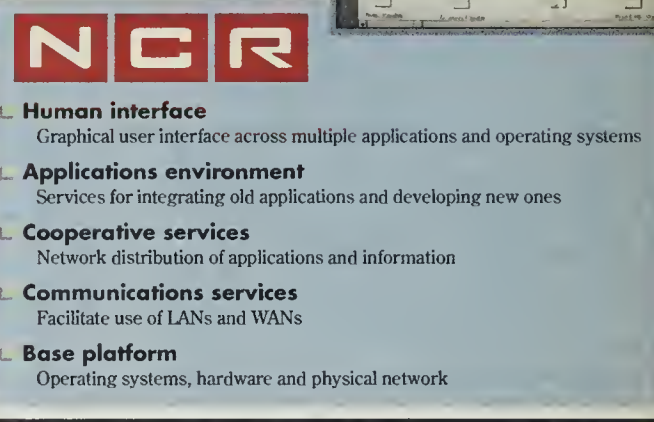
"If NCR makes this work, they'll be No. 2 in no time, and IBM better watch out," said Dick Reddecliff, data processing manager of Sarasota County's MIS department in Sarasota, Fla.

NCR said Cooperation will enter beta testing at several customer sites this month. Availability for Cooperation with OS/2 servers and DOS clients is scheduled for March 1991; general availability of Unix Version 4 servers supporting DOS clients is scheduled for August 1991.



Plan for the '90s

NCR's Cooperation strategy envisions five architectural layers, starting with a graphical interface based on Windows 3.0 and New Wave



CW Chart: Paul Mock

Network edge

On Tuesday, NCR will deliver the third leg of its new computing architecture, a networking and network management scheme called Open Network System (ONS).

According to David Passmore, a partner at Ernst & Young's network strategies consulting group in Fairfax, Va., ONS will run on NCR's recently announced System 3000 hardware platform under Unix and NCR's Cooperation environment. An ONS node can be used either as a multiprotocol bridge router or as a network applications processor, for such services as electronic mail.

ONS will support Transmission Control Protocol/Internet Protocol, OSI, XNS (Xerox's old network protocol, now used in varients by 3Com Corp. and Novell, Inc.) and Digital Equipment Corp.'s Decnet. It will also support T1, Fiber Distributed Data Interface and X.25 transport protocols, as well as Ethernet and token-ring.

Making use of the same object-oriented "encapsulation" technique used by Cooperation to accommodate proprietary sofware applications, an ONS node will be able to handle data traffic using IBM's Systems Network Architecture (SNA) proprietary protocol. Network management will be handled by a new version of NCR's Netmanager software, which already supports LAN and PC management. Netmanager Release 3 will include support for the ONS node.

General availability of the ONS node and the new Netmaster is scheduled for the first quarter of 1991, coinciding with the general release of Cooperation.

OSF outlines pricing for distributed package

BY JOANIE M. WEXLER
CW STAFF

Large user companies and universities that would rather do their own integration of the Open Software Foundation's (OSF) Distributed Computing Environment (DCE), as well as the vendors who intend to support it, now have an inkling of what the price tag will be.

Last week, the OSF outlined the pricing structure for its DCE, a package of operating system- and network-independent integrated technologies announced in May and slated to ship during first-quarter 1991.

Universities may purchase a $5,000 site license, which gives them unlimited copies of source code and object code. For buyers that do not need to redistribute the software — such as companies that would like to study the technology and determine their requirements for their vendors — the cost is $15,000 for a three-copy source-code license. A three-copy license is $60,000 for systems integrators, who will resell the product.

The final cost to end-user companies buying repackaged DCE from vendors cannot be determined until the vendors have ported DCE to their platforms and priced the product. However, according to Jonathan Gossels, OSF's business area manager, a goal of the pricing structure is to allow distributed computing to proliferate, not just to allow deep-pocketed companies to use the technology.

Object-oriented credo praised

It is Cooperation's deep commitment to object-oriented programming that scored the biggest points among observers, who said that while other vendors use the object-oriented metaphor for the visible user interface but employ older, procedural code in the back end, the NCR product scheme extends object-oriented techniques throughout.

NCR said that the object-oriented philosophy, which reuses common pieces of software code across applications wherever possible, has been shown to provide up to 60% improvement in end-user productivity and decrease application development cycles by 70% compared with conventional programming languages.

"This is what IBM should have done with Officevision," said Stuart Woodring, an analyst at Forrester Research, Inc. in Cambridge, Mass.

Indeed, there have been reports that IBM is even now attempting to incorporate object-oriented programming into a number of its systems, including Officevision, AD/Cycle and even Systems Application Architecture (SAA). Woodring said he has heard on the street that IBM would offer an object-oriented SAA language by the end of the year.

Christopher Stone at Object Management Group, Inc. (OMG) in Framingham, Mass., said the object-oriented concept "has been real ethereal for the past year" but that NCR has lent credibility to the approach. "Frankly," he added, "they're one of the first to announce — publicly — but a lot of people are working on it."

NCR is a board member of the OMG, which now claims 90 international software, hardware and end-user members.

Cooperation is composed of 54 software modules, from electronic mail to an SNA APPC developer's kit.

The software consists of five layers (see chart), and applications that do not use object-oriented techniques can be "encapsulated" by the environment, NCR said.

For the user interface, Cooperation has an enhanced version of Hewlett-Packard Co.'s New Wave.

Among the more interesting modules in Cooperation are Workflow Automation, a graphical, object-oriented tool for designing and analyzing complex tasks; and the Business Information Monitor, which NCR bought from Channel Computing, Inc. in Newmarket, N.H., which allows a user to automatically gather data from a variety of sources and display it graphically.

Quake

FROM PAGE 1

last quake, Parady was locked out of the Pacific Stock Exchange building for several days by city officials, who shut off electricity for fear of gas leaks.

Some companies, such as Intel Corp. in Santa Clara, Calif., and Clorox, Inc. — whose Oakland data center was severely damaged — have moved their mainframes out of the most vulnerable areas, citing concerns about earthquakes. American President Companies Ltd., an Oakland shipping firm, is one of several considering the addition of a secondary data center in seismically stable locations — Sacramento in APC's case. The areas most likely to be hit by a major earthquake stretch south from San Francisco to beachside Santa Cruz and extend inland to Berkeley, Oakland and San Jose.

Those who could not or did not want to move the corporate data center spent part of the past year bolting down filing cabinets and anchoring disk drives.

Silicon Valley giant Hewlett-Packard Co. had to close down two buildings for several months after the quake. Now, it is looking for more disaster recovery sites and outfitting computer rooms with rolls of plastic to prevent computers from shorting out if sprinklers are set off. "My gut feeling is that we're taking safety seminars a lot more seriously," said Mary Bechtel, computer operations manager at HP's Palo Alto data center.

Proper testing of disaster recovery procedures, IS managers said, is the only way to plan on continuing operations the next time: "We're going to have a mock earthquake drill this month, complete with an emergency operations center and medical care," said Joe Beaupre, telecommunications manager at Kaiser Permanente, which has a data center in Walnut Creek.

But IS managers in smaller shops find themselves limited in what they can do to prepare for future disasters, other than laying in a supply of folding cots, canned food and water.

"There just isn't any money," said Dave Macdonald, director of data processing for Alameda County, just east of San Francisco. The county, which includes the battered city of Oakland, suffered damage severe enough to close down City Hall — a building that stands empty to this day. Two county workers were among those who died in the collapse of the Cypress overpass on Interstate 880 last year. "The county's priorities are health and police protection," Macdonald said. "When you're laying off deputies and health care workers, it's hard to get another million for DP."

The U.S. Geological Survey (USGS), based in Menlo Park, is telling area residents that there is a 67% chance of another quake of equal or greater size in the next 30 years. "That quake could strike at any time, including today," warned a glossy-paged special USGS report tucked into Sunday newspapers several weeks ago. Scientists do not know whether the next rupture would come on the famed San Andreas coastal fault or the parallel Hayward fault on the inland side of San Francisco Bay.

In anticipation of another large quake, many national and global IS enterprises are quietly planning to take San Francisco out of the loop in nationwide data and voice networks.

"In the last six to nine months, we've seen a focus on alternate network routing," said John Ratliff, senior vice-president at Comdisco Disaster Recovery Services (CDRS) in Rosemont, Ill. "All of the disaster plans got a hard look, with a heavy emphasis on testing [at hot sites]."

CDRS and Sungard Recovery Services, Inc., in Wayne, Pa., which are the two largest recovery firms, reported an increase in satellite and microwave links that could bypass damaged ground lines in another earthquake. Also in the running is IBM, which expanded its own Business Recovery Services Division in late 1989 to compete head-on with CDRS and Sungard. All three disaster planning services offer California "business recovery" sites that can house a client's operations staff during a recovery period.

Through network interfaces, IS staffers are able to launch applications that are actually running on remote mainframes scattered from coast to coast. The industry trend is toward local business recovery centers, which would keep staffers closer to home during emergency periods. During the 1989 quake, however, staffers found themselves scrambling for petty cash before jetting to faraway backup centers (see story below left).

Of all factors, the human component of disaster recovery remains the most difficult to calibrate, IS managers said (see story below right). In the minutes after a quake, psychological trauma, coupled with concerns about immediate family, are of greatest concern.

Senior Correspondents James Daly and J.A. Savage and Correspondent Jim Nash contributed to this report.

An idea comes of age

James Albert had a vision of computing after the earthquake, and it didn't particularly look like mainframes.

Albert, MIS manager at the San Francisco's Bureau of Building Inspections, installed five personal computers at a public school in the city's hard-hit Marina district in the hours following the 1989 quake.

The city's more than 100 inspectors used the PCs to track information on crumbling buildings, including which of the structures were marked for demolition with bright red tags.

Housed in a trailer, those PCs were linked together into a local-area network, using donated Sun Microsystems, Inc. TOPS network cards. "We were jury-rigging an environment that had multiple copies of Ashton-Tate's Dbase III," Albert said.

The bureau's small system proved so effective — and so mobile — that it served as a prototype for a larger system of networked PCs now being installed at bureau headquarters near San Francisco City Hall. By year's end, Albert hopes to have more than 100 Intel 80386-based PCs installed on that Novell, Inc. LAN, along with an aging Four-Phase minicomputer that contains historical data.

Andy Freeberg

James Albert *turned to PCs for help after the quake*

Notes from graduates of Hard Knock U.

The earthquake of '89 taught IS practitioners here a few lessons about surviving a natural disaster that no one teaches in the university — unless it's the College of Hard Knocks.

The lessons, which could just as well apply to another type of natural disaster, or to a power failure like the one caused by this summer's Wall Street fire, include the following:

- Always keep a supply of petty cash on hand. Bechtel Corp. employees, about to fly to Sungard Data Systems, Inc.'s recovery center in Philadelphia, couldn't find very much of it after the quake. "I had about $20 on me," said one Bechtel employee, "and all area ATMs were out of order. I was able to collect about $300 from co-workers, and that proved to be sufficient until we arrived in Philadelphia."
- Have a supply of food, water and cots on hand — you might not be able to get home. A first-aid kit and a supply of portable personal computers might also help. San Francisco commuter trains stopped for a time, and the Bay Bridge became impassable after a 50- by 70-ft upper section fell onto the lower span. "We now have extra cellular phones and computers for our command center, along with cots and food," noted Jane Paradise, manager of corporate information security at Apple Computer, Inc.
- Have a list of home numbers for key personnel, including vendor contacts. Some San Francisco data centers could not get their hands on all their backup data tapes during the first hours after the earthquake. In many cases, the original tapes were placed out of reach by city officials who blocked entry to damaged buildings. One Oakland software firm had to carry data tapes by hand out of the 11th-story window of its building, in which the central staircase separated from the stairwell walls. The person who carried the tapes was rescued by fire truck.
- Get an emergency generator or an uninterruptible power supply if you do not already have one. Many data centers, including the Pacific Stock Exchange, Matson Navigation and Hills Brothers Coffee Co. in San Francisco, were intact but without power for several days.
- Know how to reconfigure your national data network. Apple's primary data center in Cupertino, Calif., kept running after the quake. But the disaster showed how vulnerable it was to disruption from quakes. Following 1989's Hurricane Hugo, Cupertino backed up Apple's Charlotte, N.C., distribution center. Apple has revamped its disaster plans, contracting with all three major hot-site vendors for backup.

Some badly shaken

SANTA CRUZ, Calif. — Doug Michels could not stand up during the Oct. 17, 1989, earthquake. "I'm a native Californian, so I didn't worry about it for the first 10 seconds or so," recalled Michels, executive vice-president of software firm The Santa Cruz Operation last week. "But then, like everybody else at my afternoon meeting, I dove under the conference table. I couldn't do anything else."

Michels was fortunate. Although SCO's three-story headquarters building was within a few miles of the earthquake's epicenter in the Santa Cruz mountains, the building remained intact, and no one was seriously hurt. "Some of the welds in our earthquake bracing cracked, but at least the bracing worked."

SCO's Michels *dove for cover*

"We didn't realize how bad it was until it was over," the 36-year-old Michels said, describing a postquake scene of fallen ceiling panels, keeled-over filing cabinets and drizzling ceiling sprinklers.

Not all the damage was physical, however. "You come to grips with your own mortality after an event like that," Michels said. In the week following the quake, SCO brought three psychologists on-site to help individuals and groups of workers as well as their spouses cope with the emotional trauma.

NEWS SHORTS

Ingres deal progresses

Ask Computer Systems, Inc. last week extended by one week its tender offer of $9.25 per share for shares of Ingres Corp. common stock, setting a new deadline of Friday, Oct. 19. Ask had announced last month that it plans to acquire relational database management system vender Ingres for about $110 million with the backing of Hewlett-Packard Co. and Electronic Data Systems Corp. In a related development, a Delaware judge rejected a major stockholder's bid to block the deal.

Productivity pack for Windows

Microsoft Corp. moved to smooth the bumps users may encounter on the road to Windows 3.0 with the introduction of the Microsoft Productivity Pack for Windows, a collection of programs that work as a computer-based reference program. The pack offers three applications — Learning Windows, Working Smarter and Quick Troubleshooter — that give answers, exercises and technical advice for the graphical user interface. Suggested retail price is $59.95.

German school buys Alliant super

Alliant Computer Systems Corp. announced recently that it had sold the first U.S.-made supercomputer to an eastern Germany customer, Humbolt University. The oldest university in Berlin, where Albert Einstein developed his theory of relativity during 1914-16, will use the Alliant FX/Series supercomputer for scientific applications.

EMC to offer 4M-bit cache boards

EMC Corp. plans to announce cache memory upgrades this week for IBM's top-of-the-line disk controller at prices 25% below IBM's. The IBM 3990 Model 3 cache upgrades, which EMC said will be available immediately, use 4M-bit technology, whereas IBM's upgrade boards use 1M-bit chips. This provides no space advantage or capacity advantage, however, because the actual upgrade cards will be the same size as IBM's. However, a 64M-byte to 128M-byte upgrade from EMC will cost $115,200. The same upgrade from IBM costs $153,600.

Settlement in suit against IBM

IBM reached an out-of-court settlement in a suit filed by XL/Datacomp, Inc., a major distributor of IBM's Application System/400 series machines. The suit was filed when XL and IBM could not agree on how to end XL's role as an authorized industry remarketer for IBM. Under the terms of the agreement, IBM will provide software support at no charge or at limited charges to customers who purchased IBM systems from XL. IBM will also pay an undisclosed amount to XL to resolve disputed bonus claims.

DG wins back federal award

Data General Corp. received good news last week in the form of a $127 million Department of the Interior contract reinstatement. In December 1989, DG had been contracted to provide a nationwide computer network of Aviion systems to the Water Resources Division of the U.S. Geological Survey, when the contract was protested by another bidder. The Court of Appeals for the Federal Circuit in Washington, D.C., ruled in DG's favor and reinstated the contract, which includes more than 6,000 DG Aviion workstations and servers to be installed during the next four years.

Chemical maker outsources

Andersen Consulting racked up its first Canadian outsourcing contract last week, a $5 million deal to take over the entire information systems operation of Marsulex, Inc., a manufacturer of sulfuric chemicals. Marsulex was created by a 1989 leveraged buyout of the chemicals business of another firm, and the new owners decided to transfer IS from the former parent to Andersen. Marsulex, a $160 million company, is the first customer at Andersen's new $23 million data center in Toronto.

Software AG branches out

BY JOHANNA AMBROSIO
CW STAFF

RESTON, Va. — Software AG of North America, Inc. last week made public its far-reaching plans for providing software to help users write distributed and cooperative applications. This represents a major strategic change from the company's primarily mainframe-oriented approach of the past, analysts said.

The goal of the new scheme, called Entire, is to help users move from host-based computing to transparently accessing and manipulating information across multiple and heterogeneous platforms. "Entire will build a bridge between the old and new worlds of computing," said Peter Page, Software AG's executive vice-president.

The first piece of the puzzle to be made available will be the Entire Function Server Technology series. This will allow users to evolve existing applications into functions that sit on servers accessible by personal computers. This way, users can isolate specific applications and share them.

Applications that reside on servers can be written with Software AG's Natural fourth-generation language or Cobol. Software AG officials said the scheme will work with IBM's Repository Manager and will fit within IBM's Systems Application Architecture. Also, Software AG is providing some new PC applications of its own, including text management, office automation and a geographic information system that combines geographical and textual data within one physical database.

Entire will support OS/2 and Unix, as well as VM, MVS and Digital Equipment Corp.'s VMS operating system. Servers will be able to access DB2, Software AG's own Adabas database management system and any other database that understands IBM's SQL. After years of downplaying SQL's importance in the industry, Software AG is finally implementing it in Adabas.

Also, Entire will provide for any-to-any connectivity among the supported clients and servers. Software AG will make a services layer available to take requests from, for example, an OS/2 application and convert it into something that an MVS application can understand. This layer will handle multiple communications protocols, including Systems Network Architecture, Advanced Program-to-Program Communications, Decnet, LU6.2, Netbios and others.

Page said this will allow for "Lego programming" — to hide the communications concerns from both end users and programmers.

Some of the software to allow all this to occur will be available by December; some of it will take 12 to 18 months to roll out, the company said.

Excitement stirred

Observers seem impressed with the plan. "It's an exciting announcement," said John Logan, vice-president of the Aberdeen Group in Boston. "MIS managers' No. 1 concern is using the microcomputers they've bought to distribute the processing."

Of note, analysts said, is that Software AG will allow other applications to be brought in besides those developed with the company's traditional tools.

However, observers said, there was one part of the plan that users should be wary of. "This architecture and set of tools is based on a set of protocols Software AG will develop. So it's not really 'open,' because users are still buying into something that's dependent on a vendor," said Adam Rin, vice-president of Gartner Group, Inc. in Stamford, Conn. "But Software AG is a stable, long-term player, and that alleviates the concern."

Colby Springer, vice-president of information services at Pearle, Inc. in Dallas, said he is most looking forward to the ability to run the same software across different hardware platforms. Pearle, the parent company for stores that sell eyeglasses across the country, has an IBM mainframe and Unix-based point-of-sale systems. "It will be great to be able to cross multiple platforms and not have to reinvest in different tools," he said.

Still, most industry watchers said there is a good chance that the company, long well-regarded for its technological strengths, will be able to pull all this off. "I haven't a doubt that they will be able to do it," said Paul Hessinger, chief technology officer at Computer Task Group, Inc. in Buffalo, N.Y.

Some also noted that this strategy also represents survival for the country's six largest software vendors.

"They're getting into a more robust, growth-oriented segment of the database market," said Stuart Woodring, director of software strategy research at Forrester Research, Inc. in Cambridge, Mass. "They're giving both their customers and themselves a growth path from the old-world DBMS into a new-world DBMS. Now we'll see if they can deliver."

X terminal marks the spot for Wyse system

BY MARYFRAN JOHNSON
CW STAFF

SAN JOSE, Calif. — Wyse Technology jumped into the X terminal market last week and also introduced a Unix-based multiuser midrange system.

Wyse unveiled the Series 7000I Model 740, the first in a series of systems based on the Intel Corp. I486 chip.

"Wyse's hope is to become a player in the small to medium-size computer market in the same fashion as it has in the terminal market," said Paul Cubbage, an analyst at Dataquest, Inc. Wyse now holds about half the U.S. market for general-purpose terminals.

The new WY-X5 networking terminal is based on a 32-bit Motorola, Inc. 68020 microprocessor and is priced at $1,799. Designed for the X Window System operating under Unix environments, the terminal will be available in the first quarter of 1991.

Company officials acknowledged that the worldwide market for X terminals is still relatively small, with less than 70,000 units expected to be sold in 1990. Yet Wyse is banking on that market blossoming to 486,000 annually by 1994, based on projections from International Data Corp. in Framingham, Mass.

The Series 7000I will be marketed as a "bridge platform" between Wyse's low-end 5000 series and high-end 9000 series, aimed at users who want the multiuser power of Unix along with access to DOS- and OS/2-based environments, company officials said.

The Model 740 is scheduled to begin shipping in December at prices ranging from $17,500 to $31,450. Initially, the machine will support one 33-MHz processor and run at 27 million instructions per second (MIPS). Eventually, Wyse said, it will be scalable to three processors, a mix of 33-MHz and 50-MHz chips.

"Wyse is pioneering the technology of pushing the I486 [processor] into the midrange market," said Rikki Kirzner, a senior analyst at Dataquest. "This is giving a midlife kicker to their existing product line, and it allows them to capitalize on what they knew best without scrapping the old product line."

AMD wins round in 386 dispute

BY MAURA J. HARRINGTON
CW STAFF

SANTA CLARA, Calif. — Intel Corp. "double-crossed" a competing semiconductor firm by not transferring sales and manufacturing rights for its 80386 chip, an arbitrator declared last week. Whether that judgment will allow Advanced Micro Devices, Inc. (AMD) future rights to the 80386 remains unclear.

Retired California Superior District Judge J. Barton Phelps released his decision last week in a 3-year-old dispute over whether Intel subverted a pledge to provide 80386 manufacturing rights to AMD. Such agreements, known as second-sourcing, were formerly a common practice among chip makers to allay concerns among customers about product availability.

Intel's decision to retain sole manufacturing rights to the 80386, which has become the standard for high-performance personal computers, has allowed the firm to maintain a lock on the market and keep prices high.

Last week, Intel reported that third-quarter revenue exceeded $1 billion for the first time in its history, chalking up a profit of $172 million. AMD reported a loss of $17.8 million on revenue of $25.4 million.

Regarding AMD's licensing rights to Intel's IAPX product family under a 1982 agreement, Phelps pulled no punches in affirming that AMD had been wronged. "AMD has been double-crossed by Intel when Intel, having achieved its aims of establishing the IAPX family in the marketplace, abandoned AMD by refusing to transfer to AMD the 80386," he said.

Still questions

Whether AMD can acquire rights to manufacture the 386, however, was left unanswered until a future step in the arbitration process. The 386 is not, Phelps ruled, specifically cited in the agreement between AMD and Intel as a product that would be exchanged. But whether the losses suffered by AMD as a result of Intel's actions are sufficient to warrant such a transfer will be decided later, said Phelps, who also said Intel was within its rights in declining to accept certain AMD products in exchange for Intel technology.

"Intel is pleased that today's decision does not require the transfer of the 386 microprocessor," company General Counsel and Vice-President F. Thomas Dunlap Jr. said in a prepared statement Thursday after the ruling was issued.

AMD, however, said it will ask Phelps to assess $500 million in monetary damages and rights to the 80386 chip during the next phase of the arbitration proceeding, according to Chairman and Chief Executive Officer W. J. Sanders III.

The case "is certainly not going to put either company out of business," said G. Gervaise Davis III, a partner at the Monterey, Calif.-based law firm of Schroeder, Davis & Orliss who has specialized in computer law for more than 20 years and has been following the AMD/Intel dispute. The real issue to consider is not whether AMD will win full rights to the 386 but whether it is legal for the company to copy the technology under the AMD/Intel agreement, he said.

AMD said last week that it has already reverse-engineered its own version of Intel's 386 chip.

However, earlier in the week, U.S. District Judge William Ingram issued a temporary restraining order prohibiting AMD from using the numbers "80386" or "386" in the name of any new product. The order is in effect until a court hearing today.

Intel filed for the order recently after it discovered that AMD was planning on calling a future product the "AM386." Intel said it learned of the upcoming announcement after an Intel employee named Mike Wedd stayed at the same hotel as an AMD employee with the same name. The AMD documents containing news of the upcoming chip were then mistakenly forwarded to the Intel employee.

Diskless PS/2 finally surfaces for LAN use

BY RICHARD PASTORE
CW STAFF

IBM last week dribbled out the first of several anticipated Personal System/2 announcements for the fall season. The least exciting came first in the debut of the PS/2 Model 55 LS, a diskless workstation intended primarily for use as a local-area network node.

The diskless machines are based on the 16-MHz Intel Corp. 80386SX chip and come equipped with 2M bytes of memory, the Micro Channel bus and a remote software-loading utility. They support either IBM Token-Ring LAN installations or Ethernet networks with adapter cards included.

Diskless personal computers have been around for a while, appealing to a subset of users who require data security and begrudge paying extra for magnetic media they do not need on a LAN station. Indeed, according to several observers, IBM had been configuring its Model 55SX without disk drives on special request for the past year.

The IBM entries do not have the value-added security features that distinguished Compaq Computer Corp.'s diskless PCs unveiled last spring [CW, May 21], said Frank Michnoff, an analyst at Meta Group, Inc. in Westport, Conn.

"IBM didn't do anything to distinguish this diskless model from the 55SX with any additional features," he said. "It's another example of IBM being a follower and not a leader."

The Token-Ring model is available now for $3,490 — $5 less than the list price of the Model 55SX with a 30M-byte hard disk. The Ethernet version costs $2,950 and reportedly will ship next month.

IBM also announced an Ethernet PS/2 Adapter/A, which is included with the 55LS but is an option for other PS/2s. The $575 board is set to ship next month.

In addition, the company unveiled a wide-carriage ink-jet printer called the Execjet Printer. Optimized for quiet operation, the printer is available now for $1,099.

Compaq

FROM PAGE 1

Like its Intel 80286-based predecessor, the LTE 386S will set an early standard for both customers and competitors, observers said. "It will become the standard, because the baseline is the 386SX for the desktop PCs, laptops and probably for notebook PCs," said Stephen Rood, microcomputer technology manager at Coopers & Lybrand in New York.

Janice Rubin

Compaq's Rod Canion *displays company's new 80386SX-based laptop*

Rood had passed up the LTE 286 in favor of high-end Toshiba Corp. portables because of the difference in screen resolution and power, but the LTE 386S will receive "serious" consideration for future purchases, he said, especially when weight is a key factor. The LTE's poundage is less than half that of the 386-based Toshiba 5200.

At fellow New York accounting giant Deloitte Touche, the old LTE could not handle the firm's field applications — more than 30M bytes worth of software. The new LTE high-end model, with a 60M-byte hard disk, is the first notebook PC worth his consideration, said MIS manager Claude Rankin.

Although there is still a market for the less powerful LTEs, which will not be discontinued, the new model "is a great piece of equipment and will be a good seller," said Andy Seybold, a portable computer analyst at Dataquest, Inc. in San Jose, Calif. However, Compaq's market lead will be "very temporary" in light of coming competition, he said.

"We now have a target for everybody in the world to shoot at," Seybold said. "There's going to be a commodity laptop, and it'll be the 386SX notebook with VGA, a couple of megs and a hard drive and floppy."

Seybold said he knows of three rivals coming within the next month, one of which, he said, will best the LTE's display and weight at about the same price.

Epson America, Inc. has already announced a 386SX-based notebook to be delivered late in the year. Compaq is not worried, however, according to marketing manager Lorie Strong. "We're fairly confident that from a performance and functionality standpoint, we'll have a fairly nice lead," she said.

> THE LTE 386S "will become the standard, because the baseline is the 386SX for the desktop PCs, laptops and probably for notebook PCs."
>
> STEPHEN ROOD
> COOPERS & LYBRAND

Nevertheless, the competition will soon escalate into a price war, observers agreed. "I think we'll see price wars in this category," Rood said. He and other users said they would hold off any purchases to see how the prices shake out.

Competition and the economies afforded by the coming Intel 386SL integrated chip set will drive notebook prices down into the $4,000 to $5,000 range, predicted Richard Horan, editor-in-chief of "Portable Technology Update" in New York.

Distinguishing one 386SX notebook from the next will be increasingly difficult, even for Compaq, observers predicted. "How do you build a commodity product and distinguish it from everybody else?" Seybold said.

Compaq will try to differentiate this unit with a $1,499 custom desktop expansion package. The expansion system, exclusive to the LTE 386S, includes a color VGA monitor, full-size keyboard, two standard expansion slots and mass storage options.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
Copyright 1988 by CW Publishing/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: back issues, if available, may be purchased at $2.00 per issue, plus postage. Call (800) 669-1002.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, 508-744-3350.
Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. For Back issues contact Margaret McIndoe.
Requests for missing issues will be honored only if received within 60 days of issue date.
Subscription rates: $2.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.

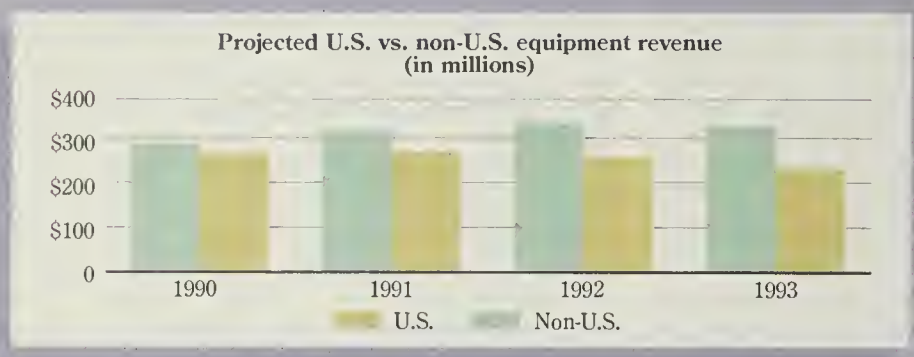
MPA ABC ABP

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, P.O. Box 2044, Marion, OH 43305.

TRENDS

Packet-Switching Equipment Market

The X.25 packet-switching equipment market will experience positive growth over the next few years, peaking in 1991

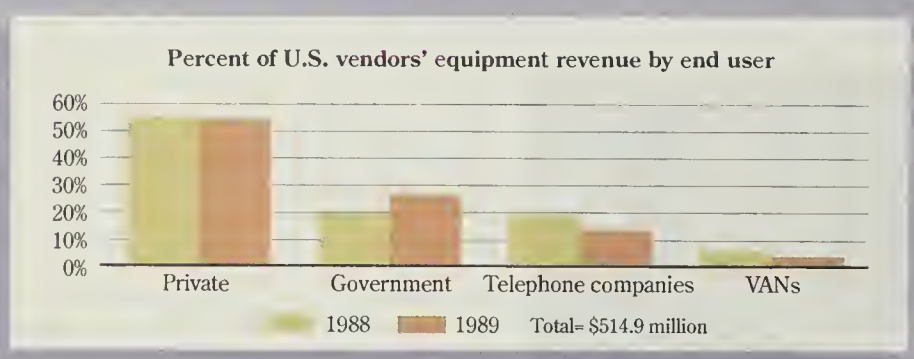


Continued deregulation in Western Europe and the Pacific Rim will open new markets for U.S. vendors, causing non-U.S. sales to rise

New systems enjoy the most growth, but demand continues in the area of add-on business

New vs. add-on business

	1988	1989
New systems	$127.2	$152.9
Percent of growth	—	20.2%
Nodes	$241.0	$280.4
Percent of growth	—	16.3%
PADs	$73.6	$81.6
Percent of growth	—	10.9%



Although sales to private end users account for 55.2% of the market, there is a shift toward the use of public networks

Source: International Data Corp.

CW Chart: Doreen St. John

NEXT WEEK

IS management is a different game at The Body Shop, the fast-growing personal care products retail chain. Systems manager **Rick Hellar**'s job is to recognize where technology is a complement to the company's unconventional business philosophy and where it is a conflict. Read more about Hellar's responsibilities in Manager's Journal.

Joyce Ravid

DOS loyalists and OS/2 hopefuls are running out of reasons to stay true as the new guy on the desktop — Unix — gains favor with vendors and customers alike. If you're curious about what Lotus, Wordperfect and Ashton-Tate have in mind for the future of their popular business productivity products, turn to Product Spotlight.

INSIDE LINES

Mark of confidence, or warning?

Last year on Oct. 17, the ground shook in California. This year, the date will be marked by the release of Ashton-Tate's financial results for the quarter just ended. Whether the news will send shareholders diving for cover remains to be seen.

What recession?

Agenda '91, the annual gathering of industry giants and those who think they are, featured a fun auction to benefit the nonprofit Foundation of Educational Software, which provides grants to fund software for elementary school teachers. For $2,500, Borland Chief Executive Officer Philippe Kahn bought a cruise on the sailboat of Lotus software guru Frank King. Kahn's contribution, a half-day of code review, went for $8,000 to rival Bill Gates of Microsoft, who also paid $6,000 to purchase former Apple Chief Scientist Jean-Louis Gassee's diamond earring. Gates donated his 20 favorite videos, which were purchased by Dave Liddell of Metaphor for $6,000. Mitch Kapor's 1940s silk Aloha shirt went to Gordon Eubanks for $1,000. In keeping with the conservative fiscal mood at Lotus these days, Lotus head honcho Jim Manzi kept his hands in his pockets and bought nothing.

Promises, promises . . .

IBM has still not delivered a Repository Manager customer document designed to explain the software's key information model. In August, the company said it would deliver it "within a few weeks." As of last week, IBM is now shooting for sometime next month. The document is IBM's attempt to address complaints about the lack of openness to Repository Manager. Currently, the only way to get details on the information model is to license Repository Manager, which costs about $4,500 per month.

. . . reality

The pricing structure for Netview Version 2, announced last month, is apparently so convoluted that even IBM's own salespeople are having trouble getting it straight. As one user tells it, his IBM sales reps were not only unable to tell him how the new pricing would affect his firm but could not even say which of the new Netview categories — distributed, centralized or stand-alone — his firm's Netview systems fell under. "They said they'd get back to me," he said. "Fortunately, we have six weeks before we have to figure out our 1991 MIS budget."

AT&T sales reps, please phone home

Don't look now, but even as AT&T swears it does not have a laptop computer in the works, with or without a radio frequency modem, corporate IS managers report meeting with AT&T representatives to discuss the new machine. The official word is that talks with Marubeni, the large Japanese trading company, are no more conclusive than they were a month ago and have not reached the stage of specific product development. Yet reports from Japan indicate that Marubeni has confirmed the laptop angle of its talks with AT&T. Of course, it is possible that no one has told AT&T's Computer Systems Division about the new product.

When less is more

This time last year, the tales of woe concerning Wang Laboratories' staggering debt load could have filled a book. As of this month, the book would have to be called *Less Than Zero.* Under a game plan fashioned and executed by CEO Richard Miller and Chief Financial Officer Michael Mee, the company quietly extinguished the last of its bank debt two weeks ago.

Oh! somewhere in this high-tech land venture gold will us bless;
The banks build assets somewhere, and somewhere gas costs less;
And somewhere Dukes can manage, somewhere presidents shout;
But there is no joy in Beantown — mighty Clemens has bleeped out.

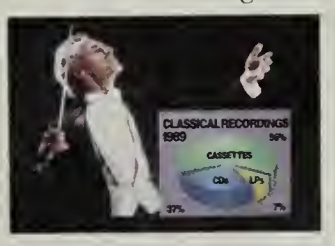
If you've got more on your mind than the ploys of summer, hit a liner to News Editor Pete Bartolik at 800-343-6474, loop a message to COMPUTERWORLD via MCI Mail or knock one out of the fax at 508-875-8931.

Don't look now, but there's something moving on your desk.

IBM Personal System/2®s with Micro Channel™ on desks everywhere are starting to exhibit some pretty wild and wonderful tendencies. They're creating incredible on-screen presentations. Interactive tutorials with full-motion video and stereo sound. Graphics, text and animation in harmonious coexistence. What makes it all possible is the multimedia capability of the IBM PS/2® with Micro Channel.

Micro Channel Makes It Look Easy.

The PS/2 itself is designed to put multimedia applications to their best use. Micro Channel has always given the PS/2 extremely fast data rates and better multitasking capabilities. But in multimedia it really gets a chance to shine. The multilane highway design of Micro Channel Architecture is perfect for processing complex multimedia applications. Most conventional PCs just don't have the power or the data paths to do it at all. Plus, Micro Channel in the PS/2 lets you use the new IBM CD-ROM that gives you the storage equivalent of over 400 diskettes on a single CD so you can have access to all kinds of data-intensive material like clip art and digital stereo sound.



Do It All. All At Once.

With a PS/2 with Micro Channel, you can start using some hot products right now. One is IBM's Audio Visual Connection.™ It's both a software and a hardware tool that allows your PS/2 to import high-quality audio, dazzling still images, even special effects, as well as text, graphics and other data. Then, you can edit and present it in any combination you like right on your PS/2 screen, share it with a network or project it on a wall. It's impressive, but don't take our word for it—IBM's Audio Visual Connection received *PC Magazine*'s Technical Excellence Award for 1989.

Another exciting multimedia product is the IBM M-Motion Video Adapter/A.™ Coupled with the power of Micro Channel, it lets you incorporate full-motion video and high-quality sound from sources like video disks, VCRs and video cameras, digitize them, and display them in an endless array of formats. And for software developers, there are ActionMedia™ cards, which use the latest DVI™ Technology, allowing full-motion video and analog sound to be compressed, digitized, stored on a hard or optical disk and played back in real time.

You've Already Got The Best Seat In The House.

Best of all, you can do it all today with the Micro Channel PS/2s you've already got. No special monitors to buy. And you'll be perfectly poised for tomorrow's most exciting multimedia technology, like interactive touch displays and much more. Contact your IBM Authorized Dealer or IBM marketing representative. Call 1 800 255-0426, ext. 10, for a free videocassette or a dealer near you. Your desk will never be the same.

For a free PS/2 MultiMedia demonstration videocassette call 1 800 255-0426, ext. 10
or send this completed coupon to: IBM Corporation
P.O. Box 92835, Rochester, NY 14692

Name_____

Title_____ Phone_____

Company_____

Address_____

City_____ State_____ Zip_____

☐ If you are a software developer, check here.

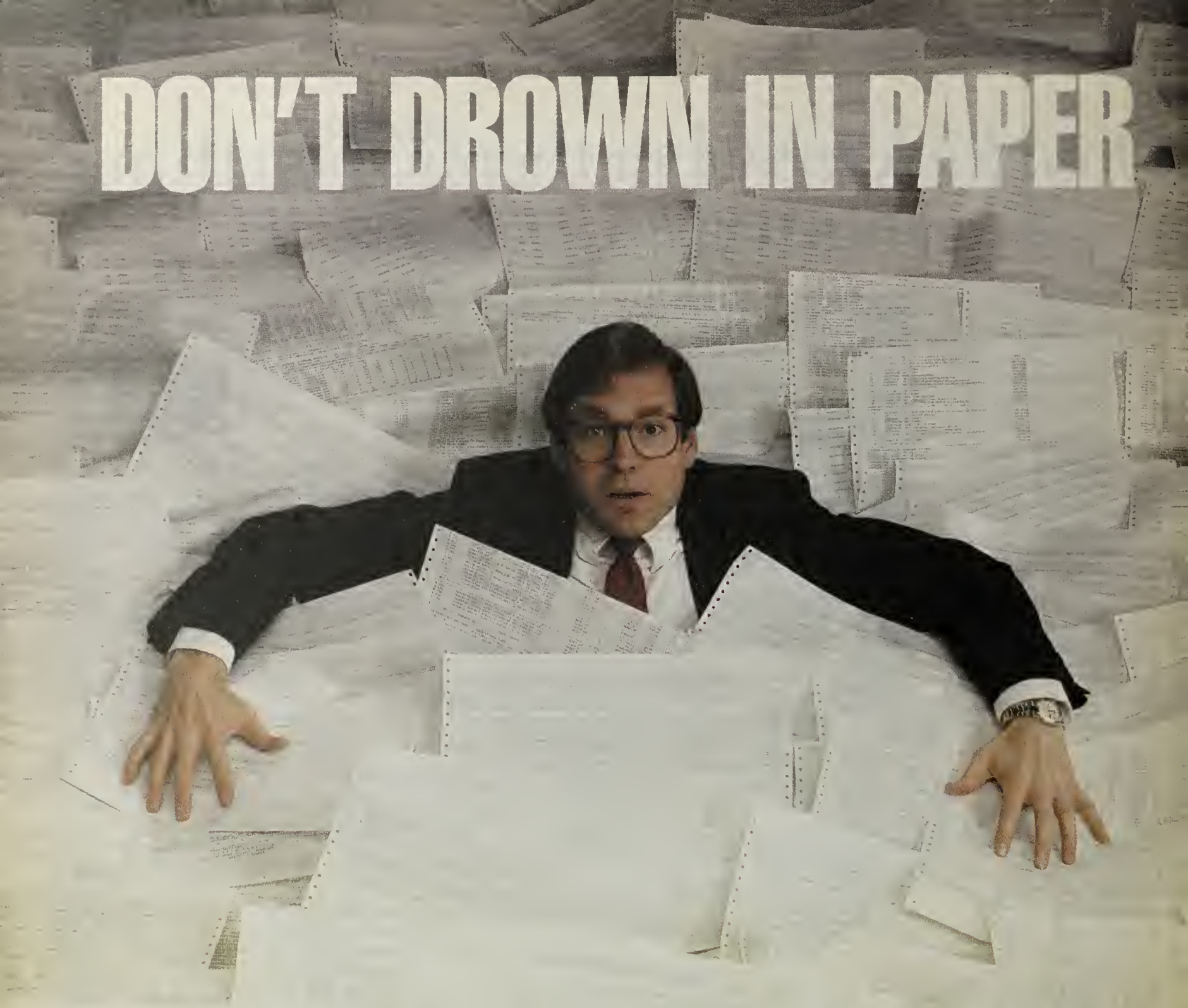
How're you going to do it?

PS/2 it!

IBM

IBM Personal System/2 and PS/2 are registered trademarks and Micro Channel, Audio Visual Connection and M-Motion Video Adapter/A are trademarks of International Business Machines Corporation. ActionMedia cards are a collaborative effort between IBM and Intel. DVI and ActionMedia are trademarks of Intel Corp. © 1990 IBM Corp.

DON'T DROWN IN PAPER



Managing the tremendous output of paper is one of today's most critical and costly concerns for MVS data centers. $AVRS/TRMS, from Software Engineering of America, provides a total solution to this expensive and resource-consuming problem, with a system for the online viewing, distribution and archival of all types of system output. $AVRS/TRMS handles all aspects of report management/distribution, and output management, including production reports, end-user reports, JCL listings and error messages, SYSLOG, and compiles. $AVRS/TRMS is powerful, yet easy to use and is accesible to all levels of personnel through a variety of full-screen, menu-driven interfaces including CICS, ISPF, VTAM and TSO. Full cut-and-paste, windowing and PC interfaces make $AVRS/TRMS a flexible and broad-based solution. $AVRS/TRMS interfaces with all popular security systems and also has multiple levels of internal security.

$AVRS/TRMS provides a complete and cost-effective solution to all aspects of report management/distribution and output management. This is why over 2,500 data centers worldwide use $AVRS/TRMS to control the paper deluge.

For a no-obligation 45-day free trial or for further information, call Software Engineering of America at 1-800-272-7322.

SOFTWARE ENGINEERING OF AMERICA

WORLD HEADQUARTERS • 2001 Marcus Avenue, Lake Success, NY 11042

(516) 328-7000 Telex: 6973556 Fax: (516) 354-4015

Products Licensed In Over 40 Countries